THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

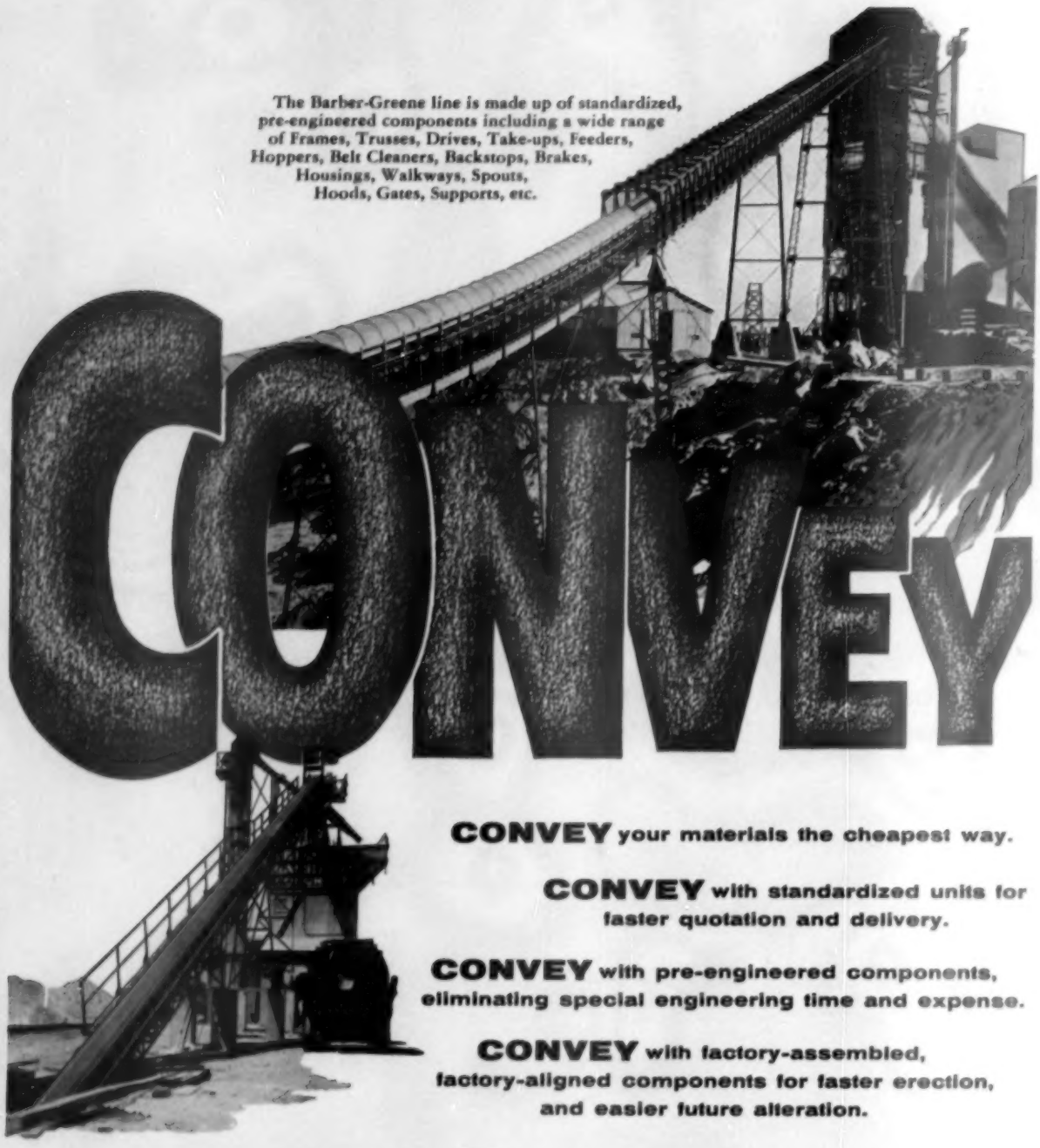
Liquid Cyclones Recovering Fine Sand page 70
Need New Sales Methods to Move Agstone Tonnage page 73
Drying While Grinding In Rod Mill page 88
Materials Accounting In Cement Manufacture page 92

Storage building of Dolomite Products, Inc., Gay, Fla., has three 225-ton bins for bulk carloading and one for bagging machine. To the rear is the mill building

AGRICULTURAL LIMESTONE ISSUE

APRIL 1955

The Barber-Greene line is made up of standardized, pre-engineered components including a wide range of Frames, Trusses, Drives, Take-ups, Feeders, Hoppers, Belt Cleaners, Backstops, Brakes, Housings, Walkways, Spouts, Hoods, Gates, Supports, etc.



CONVEY your materials the cheapest way.

CONVEY with standardized units for faster quotation and delivery.

CONVEY with pre-engineered components, eliminating special engineering time and expense.

CONVEY with factory-assembled, factory-aligned components for faster erection, and easier future alteration.

Ask for the Barber-Greene 192-page Conveyor Catalog.

54-40-PE

Barber-Greene

AURORA, ILLINOIS, U.S.A.

BG

WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Rubber belt drains off water to speed ore washing

RIDING up that conveyor belt is crushed iron ore, still sopping wet from the washing that removes sand or silica.

As you can see, this is no ordinary belt. If it were, water seeping down through the ore would form a pool at the bottom of the belt trough, and wash the ore down the 20° incline. That's why the Riffle Grip belt you see here was recommended by B. F. Goodrich.

You'll notice that the Riffle Grip belt has a series of rubber ridges molded into the cover. It's this tread with angular steps that holds the ore in place, and, at the same time, channels water to the edges of the belt where it flows off.

B. F. Goodrich engineers developed this belt to solve a gold dredging problem. And it is such an improvement over ordinary belts that it's now widely used in mining operations, sand and gravel plants, and other places where wet materials must be carried up steep inclines.

This same belt works equally well on jobs where moisture must be *held*. By changing the incline angle and the troughing idlers, the steps become a series of horizontal ribs which can carry such sloppy materials as wet mixed concrete and keep the water from draining away.

With its ability to shed water or retain it, as the job requires, the B. F. Goodrich Riffle Grip belt is making many mining and processing jobs cheaper, more efficient. Your BFG distributor will give you complete details on how this unusual belt can solve your wet material handling problems. Or write *The B. F. Goodrich Company, Dept. M-402, Akron 18, Ohio.*

B.F. Goodrich
INDUSTRIAL PRODUCTS DIVISION

Brar Nordberg *Editor*

R. S. Torgerson, Managing Editor
Walter B. Lenhart, Associate Editor
M. K. Smith, Assistant Editor
E. M. Amacher, Assistant Editor
N. O. Lange, Assistant Editor

Nathan C. Rockwood *Editorial Consultant*

Contributing Editors

F. O. Anderegg — **Tip Brown**
Victor J. Azbe — **Hubert C. Parsons**
James A. Barr, Jr.

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY — LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

April 1955

This Month

What's Happening 31

Editorial—Personal Contacts and Soil Tests Will Combine to Sell Agstone 51

Rocky's Notes—Revised "Chemistry of Portland Cement" 53

Labor Relations 55

People in the News 57

Industry News 61

Hints and Helps 64

New Machinery 66

Liquid Cyclones Recover Fine Sand 70
Atlanta Sand and Supply Co., plant at Gaillard, Ga., operates one of the largest installations of liquid cyclones in the sand and gravel industry to produce a clean, blended product *Walter B. Lenhart*

Direct Sales Approach Needed by Agstone Industry 73
Companies employing salesmen and agronomists not experiencing downward trend in tonnage. Soil Tests will prove a good sales tool *Brar Nordberg*

Agstone Prices Should Be High Enough to Do a Good Selling Job *John M. Dooly* 80

Agronomist Views on Stimulating Agstone Sales 82
Agronomists point to proven facts which should comprise educational selling

Push-Button Controlled Fine Grinding Limestone Plant 88
Dolomite Products, Inc., Ocala, Fla., opens new plant at Gay, Fla., which produces 40 t.p.h. of finely ground limestone, using a rod mill with oil-fired furnace supplying warm air to mill for drying while grinding *C. E. Wright*

Materials Accounting in Processing Portland Cement 92
Method of calculating material balance which the Puerto Rico Cement Corp., has found to be efficient *Arturo Vera, Jr.*

Crushed Stone Convention Program Uses Visual Aids to Stimulate Ideas 98
National Crushed Stone Association convention has two sessions on current operating problems, analysis of President's highway program, and status of legislation

Iowa Agricultural Limestone Association annual convention 146

A.I.M.M.E.E., Industrial Minerals Division Meeting in Chicago 150

CONCRETE PRODUCTS

Factory-Precast, Prestressed Lightweight Concrete Structural System *Hubert C. Parsons* 217
Geo. Rackle & Sons Co., Houston, Texas plant produces all major structural members for industrial buildings. Girders cast with low-slump concrete have a 28-day strength of 7000 p.s.i.

Ohio Ready Mix Employes Go to School 220

First Ytong Plant in North America *J. C. Ortengren* 222

Lightweight Concrete of Major Interest at A.C.I. Meeting 233

Preventive Maintenance in the Ready Mixed Concrete Industry *Jas. A. Nicholson* 237

Home Office

P. D. Allen, General Manager
Mary A. Whalen, Subscription Dir.
C. M. Hancock, Production Manager
C. P. Teats, Field Representative

District Offices

Eastern Area — Reginald W. Davis, Manager; Chas. Daly, Assistant, 522 Fifth Ave., New York 36, Tel. Murray Hill 2-7888.

Central Area—Geo. F. McKay, Manager, Hanna Bldg., Cleveland 15, Tel. Main 1-4362.

Midwest Area—E. H. Hickey, Manager, 309 W. Jackson Blvd., Chicago 6, Tel. Harrison 7-7890. Gerald A. White, representative.

Western Area—L. C. Thaon, Manager, 309 W. Jackson Blvd., Chicago 6, Tel. Harrison 7-7890.

Pacific Area—Duncan Scott & Co., Mills Bldg., San Francisco 4, Tel. Garfield 1-7950. In Los Angeles 5, 2978 Wilshire Blvd., Tel. Dunkirk 8-4151.

London, England—Harold F. Charles, Managing Director, Maclean-Hunter, Ltd., Wellington House, 125 Strand, London, W. C. 2.

Germany—Georg J. Linder, Wittesbacher Allee 60, Frankfurt Am Main.

ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 309 West Jackson Blvd., Chicago 6, Illinois: Horace T. Hunter, President; P. D. Allen, Vice-President; Ralph K. Davis, Secretary. Copyright, 1955, by Maclean-Hunter Publishing Corporation. Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill., post office under the act of Mar. 3, 1879. Additional entry at Long Prairie, Minn.

ROCK PRODUCTS is indexed regularly by Engineering Index, Inc. and the Industrial Arts Index.

SUBSCRIPTION INFORMATION

Subscription Price: United States and Possessions, Canada one year, $2.00; two years, $3.00; three years, $4.00. Pan American, one year, $8.00; two years, $14.00; three years, $20.00. All other foreign one year, $12.00; two years, $22.00; three years, $30.00. Twenty-five cents for single copies. Canadian subscriptions and remittance may be sent in Canadian funds to ROCK PRODUCTS, P. O. Box 100, Terminal "A," Toronto, Canada.

To Subscribers — Date on wrapper indicates issue with which your subscription expires . . . In writing to have address changed, give old as well as new address.

BEST NEWS* in your business!

* a choice of either cab-controlled hydraulic dumping, or remote-controlled dumping by external hoist.

* an unlimited choice of speed, capacity, and gradeability in truck body, trailer or tandem designs depending upon the requirements of your job.

* the *only* way that you can use tandem units . . . and that means extra capacity, extra versatility.

* unlimited choice of the prime mover of any make best suited for your job.

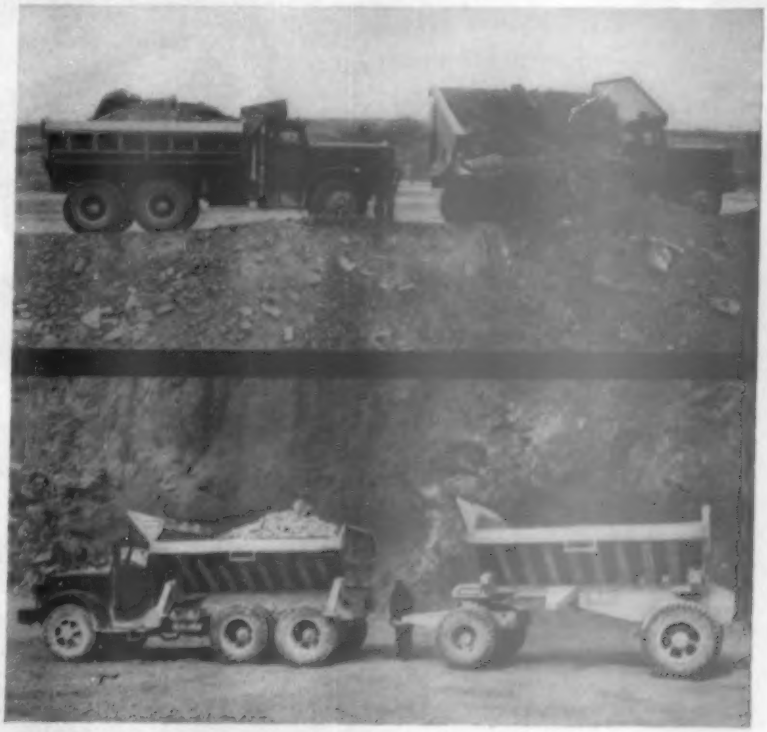
* smooth, straight-line operation . . . no backing and turning at the dumping point . . . your drivers can see where they are going, see where they are dumping, at all times . . . ease and comfort that can't be beat.

* extreme simplicity of design in body and dumping mechanism for lasting durability, less downtime, less maintenance.

* rugged, all-welded construction for heavy rock and ore, lighter construction for lighter bulk materials.

* optimum balance of loading, hauling, and dumping equipment for smoothest, most efficient production at lowest cost.

EASTON cannot recommend side-dumping unless an impartial survey proves it to be the *right* method for your job. An EASTON "okay for side-dumps" means that your haulage requirements are *right* for all the advantages that side-dumping can bring you. *That's the best news in your business!*

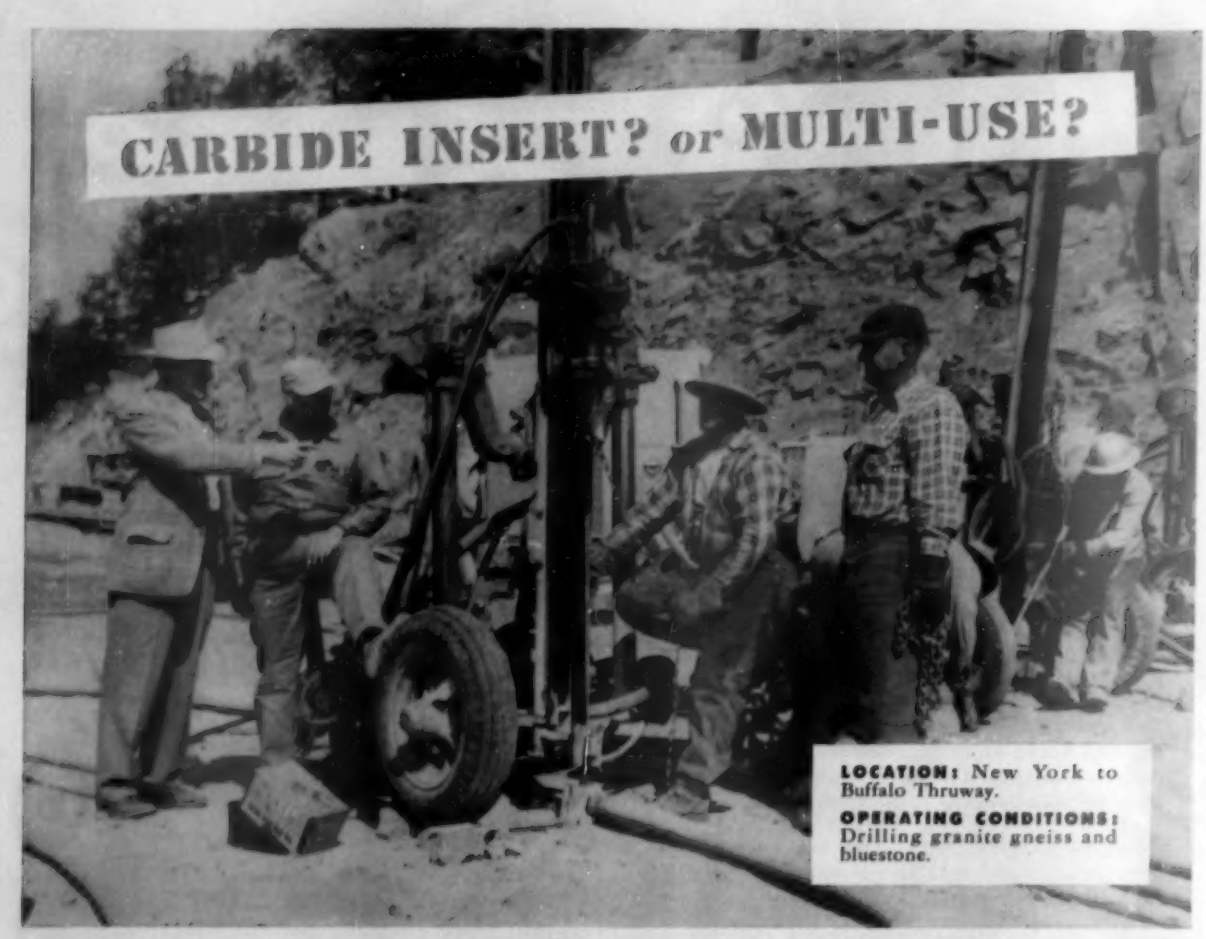


***It pays to know** that your job requirements are right for the simple principles of side-dump hauling. Our survey of your transportation problem costs you nothing, does not obligate you in any way. Write today for complete information.*

B-1064

Easton Car & Construction Company • Easton, Penna.

EASTON®
FIRST IN SIDE-DUMP ENGINEERING


CARBIDE INSERT? or MULTI-USE?
LOCATION: New York to Buffalo Thruway.
OPERATING CONDITIONS: Drilling granite gneiss and bluestone.

L. G. Defelice & Son, Inc. cuts costs on New York superhighway by using TIMKEN® carbide insert bits to drill 32′ holes in granite gneiss

IN drilling operations on the New York to Buffalo Superhighway, L. G. Defelice & Son, Inc. of North Haven, Conn., cut costs by using Timken® carbide insert bits. Drilling extremely deep holes in granite gneiss and bluestone, they get increased drilling speed, need fewer bit changes.

Through hard and abrasive ground, Timken carbide insert bits are the most economical. They are also the best bit for constant-gauge holes, small diameter blast holes and very deep holes.

But they may *not* be the best answer for *all* your drilling problems!

For ordinary ground, Timken multi-use bits are most economical. With correct and controlled reconditioning, they'll give the lowest cost per foot of hole when full increments of steel can be drilled.

Both Timken carbide insert and multi-use bits are interchangeable in the same thread series. A wide range of different Timken bits fit the same drill steel! As the ground changes, you change bits quickly, easily—right on the job!

All Timken bits are made from electric furnace Timken fine alloy steel, have the shoulder union developed by the Timken Company that protects threads from drilling impact.

For the best bit type for your particular drilling requirements, call on the Timken Rock Bit Engineering Service. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken multi-use rock bit

Timken carbide insert rock bit

your best bet for the best bit ... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ABILITY ON THE ROCK PILE

it's **11** for

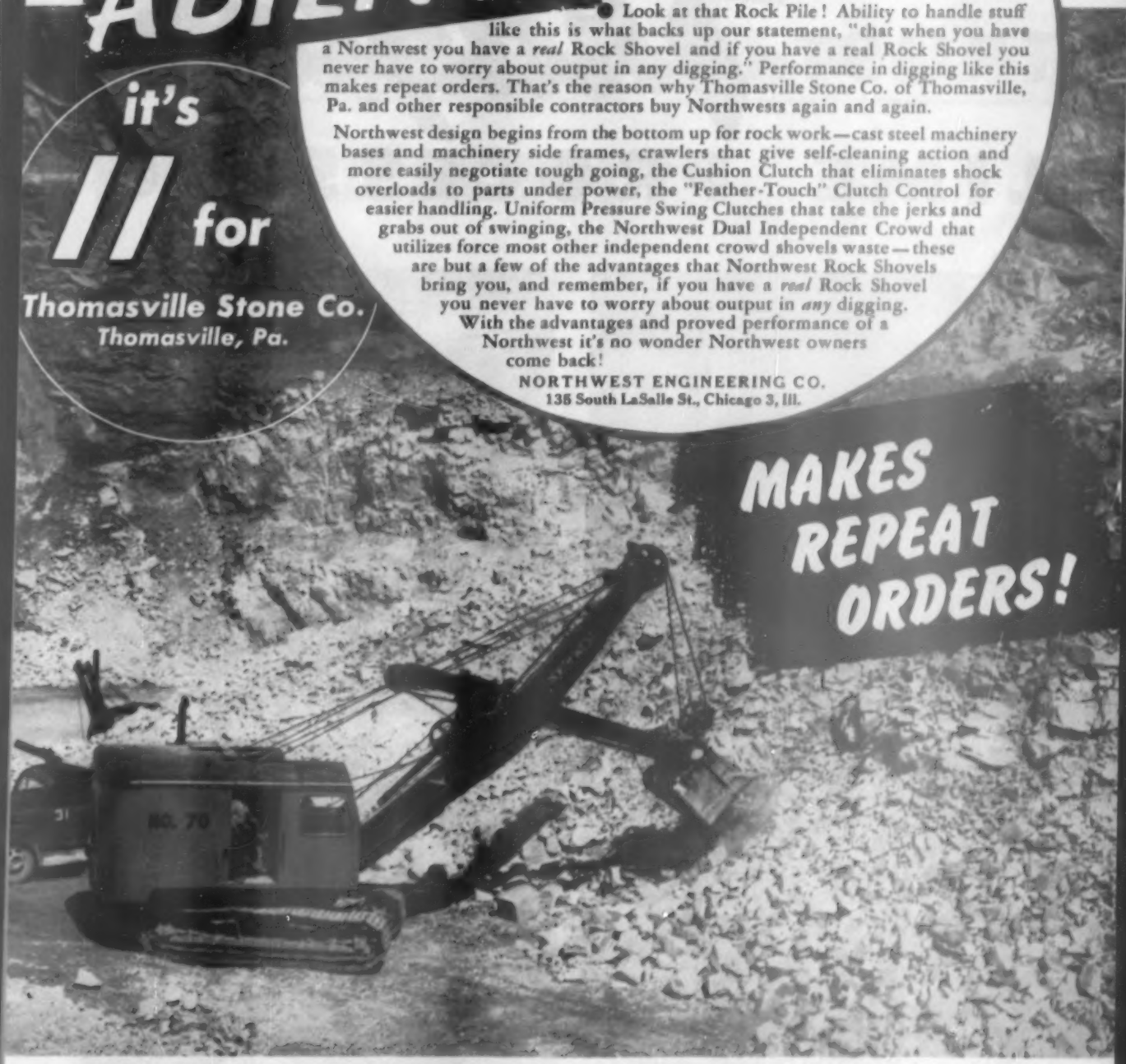
Thomasville Stone Co.
Thomasville, Pa.

Look at that Rock Pile! Ability to handle stuff like this is what backs up our statement, "that when you have a Northwest you have a *real* Rock Shovel and if you have a real Rock Shovel you never have to worry about output in any digging." Performance in digging like this makes repeat orders. That's the reason why Thomasville Stone Co. of Thomasville, Pa. and other responsible contractors buy Northwests again and again.

Northwest design begins from the bottom up for rock work—cast steel machinery bases and machinery side frames, crawlers that give self-cleaning action and more easily negotiate tough going, the Cushion Clutch that eliminates shock overloads to parts under power, the "Feather-Touch" Clutch Control for easier handling. Uniform Pressure Swing Clutches that take the jerks and grabs out of swinging, the Northwest Dual Independent Crowd that utilizes force most other independent crowd shovels waste—these are but a few of the advantages that Northwest Rock Shovels bring you, and remember, if you have a *real* Rock Shovel you never have to worry about output in *any* digging. With the advantages and proved performance of a Northwest it's no wonder Northwest owners come back!

NORTHWEST ENGINEERING CO.
135 South LaSalle St., Chicago 3, Ill.

MAKES REPEAT ORDERS!



NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

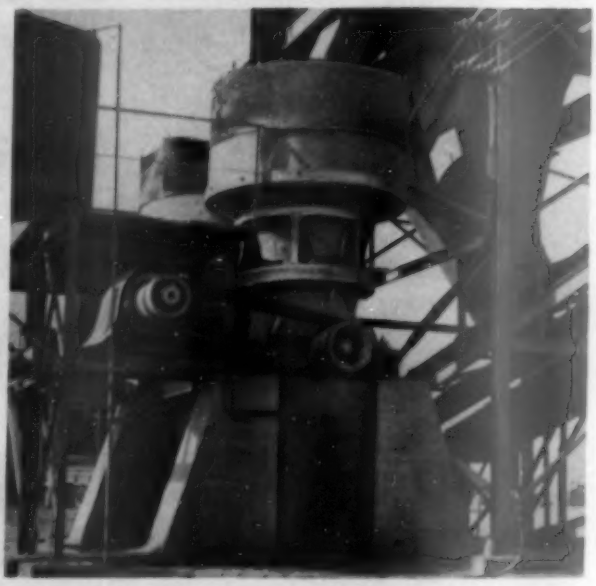
Convertible for any Mining Material Handling or Excavation Problem

TRUST Traylor LIME PROCESSING

TRAYLOR JAW CRUSHERS feature the massive construction needed for rugged, heavy-duty primary breaking. Five types are offered with feed openings from 8″ x 12″ to 60″ x 84″. All models feature Traylor's exclusive curved jaw plates which deliver greater tonnages of finer product with less horsepower.

TRAYLOR ROTARY COOLERS embody the same exclusive design features as Traylor Kilns . . . offer the same operation and maintenance economies. Traylor builds three types of Coolers, to individual specifications, to meet practically every requirement; Conventional, Diaphragm and Multiple Tube. Special Coolers are also available.

TRAYLOR TY REDUCTION CRUSHERS provide the perfect example of simple, compact design that combines maximum strength with peak operating efficiency. Traylor's famous non-chokable, self-tightening Bell Head and Curved Concaves produce exceptionally uniform products with fewer waste fines. Available in six sizes with feed openings from 3″ to 22″.

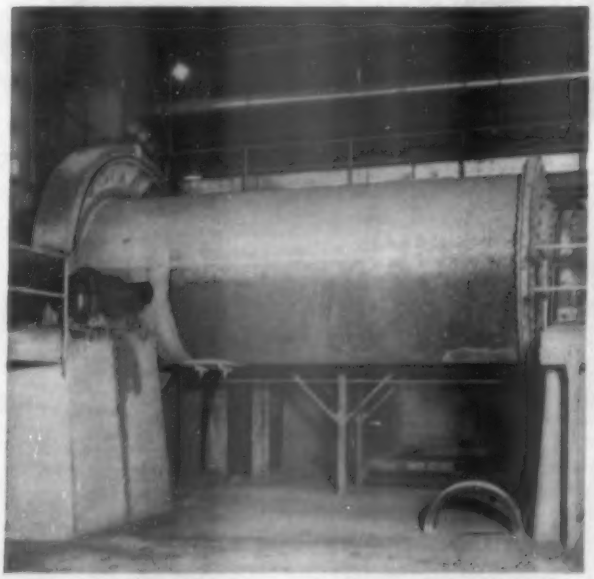


Descriptive literature on all Traylor Machinery outlining design features, operating features, specifications and capacities is available for your information and guidance. A request, stating your specific interest, will bring a free copy of the appropriate booklet to your desk promptly.

for Time-Tested, Job-Proven

EQUIPMENT

For over a half-century, leading producers of agricultural lime stone and lime products have placed their trust in Traylor. It has paid off for them with higher quality products and lower production costs. Exclusive Traylor design features provide producers with the highest degree of product control while reducing maintenance to an absolute minimum. Let these exclusive features, TIME-TESTED and JOB-PROVEN in installations all over the world, provide you with closer control over all phases of your lime production.



Canadian Mfrs.: Canadian Vickers, Ltd., Montreal, P. Q.

TRAYLOR ROTARY KILNS feature the super-strong rigidity of all-welded, steel shells plus the convenience of easily adjustable supports. These Traylor features assure perfect alignment . . . cut maintenance costs . . . reduce power requirements. All Traylor Rotary Kilns are "Traylor-Made" to the exacting requirements of each individual installation.

TRAYLOR GRINDING MILLS have long been regarded as the accepted standards of modern grinding mill design. Available in sizes to meet practically every requirement, Traylor Grinding Mills are offered in a wide variety of types, including; Rod, Compartment, Ball and Tube Mills.

TRAYLOR ENGINEERING & MFG. CO.

745 Mill Street, Allentown, Pa.

A Traylor leads to greater profits

SALES OFFICES · NEW YORK · CHICAGO · SAN FRANCISCO

ONE OF MANY NEW CRAWLER AND RUBBER-TIRED MODELS introduced by Link-Belt Speeder this past year. It's the full 1-yard capacity LS-98 — the most advanced design in modern shovel-cranes. New Link-Belt Speeder features allow owners to boost output, cut costs and increase their profit margins.

UP TO 25% MORE OUTPUT — Speed-o-Matic power hydraulic controls cut fatigue. No lag, jerk or strain.

AHEAD ON ½-YARD JOBS — It's the new LS-58, fastest, most powerful rig in its class, with "big-rig" features.

UP TO 99 NET HP FOR 1-YARD PROFITS — New heavy-duty LS-98. First time Speed-o-Matic in this class.

How to be AHEAD on every job

...use a Link-Belt Speeder! It's years ahead of the shovel-crane industry

TEAM up with the shovel-crane line that gives you the most productive capacity. It's the only line that offers you true power hydraulic Speed-o-Matic control, *and it's on every model.* Choose from many new models—with pace-setting improvements—in the ½ to 3-yard, 10 to 60-ton range. Equip for extra speed, power and work range—to bid successfully on more jobs—*and earn more on all of them.* See your Link-Belt Speeder distributor for complete facts, or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

LINK-BELT SPEEDER 15,774

Builders of a complete line of crawler and rubber-tired shovel cranes

"Mattresses" for the Mississippi

The Weymouth Construction Company of Memphis, Tennessee has the important job of casting concrete mattresses at the Helena, Arkansas casting field. Each year approximately 132,000 of these "mattresses," which require 110,000 cubic yards of concrete, are poured at the casting field. The mattresses are then picked up throughout the year and placed along the banks of the Mississippi River to help keep the mighty Mississippi flowing along its accustomed course.

Gulf lubricants and fuels are used exclusively by the Weymouth Company to keep equipment on this important operation performing smoothly and continuously. They have found that Gulf lubricants cut maintenance costs, and that Gulf fuels burn evenly and completely to insure top engine performance.

And they also appreciate Gulf's excellent engineering service, which helps insure the use of the right lubricant and fuels for each unit and climatic condition.

Contact your nearest Gulf office today and let us discuss with you how Gulf products and fine service can benefit your operation.

GULF OIL CORPORATION • GULF REFINING COMPANY
1822 Gulf Building, Pittsburgh 30, Pa.

Gulf Quality Lubricants and Fuels

... the finest for all your needs

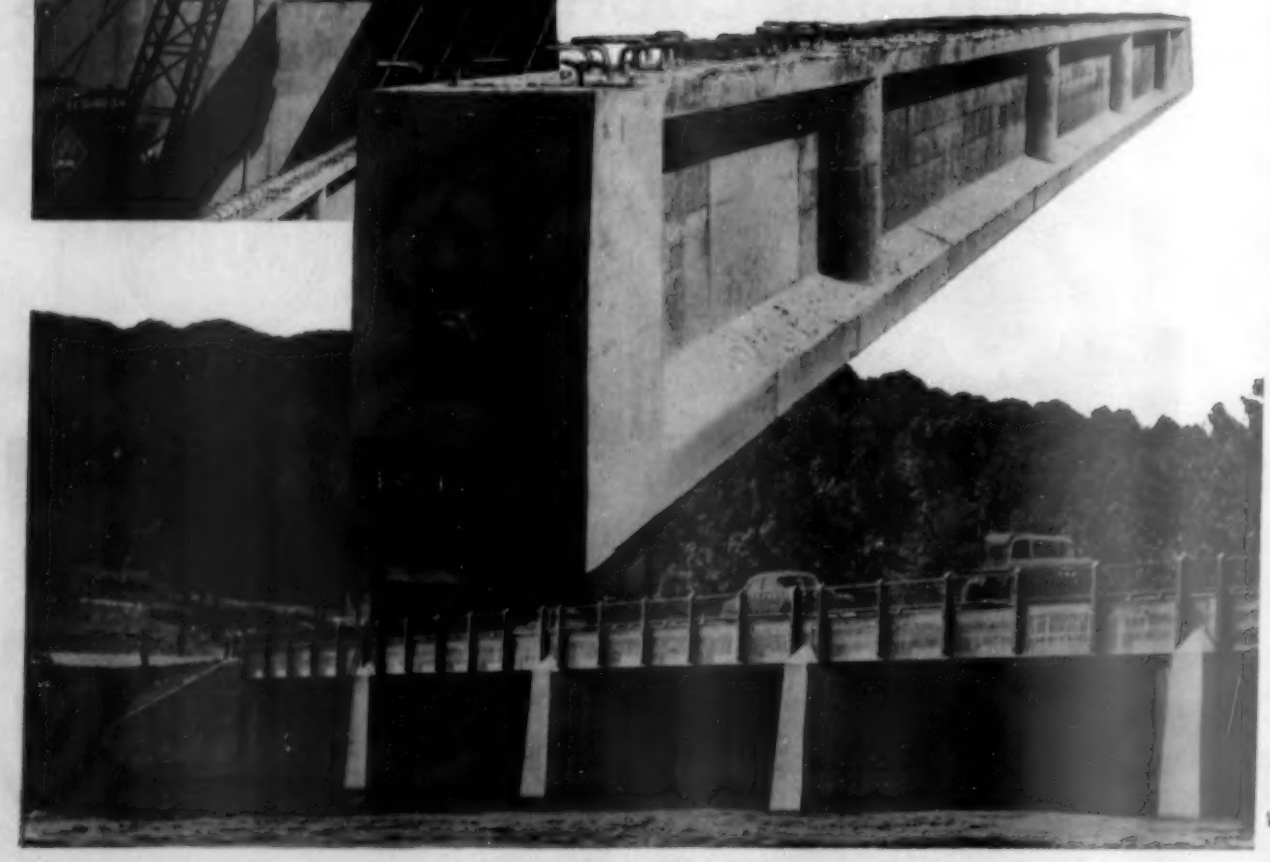
To speed construction

prestress

with American

WHEREVER you use structural beams—in concrete buildings, bridges, or piers—better investigate the cost-cutting possibilities of prestressed concrete. Prestressed beams eliminate delays caused by bad weather; they eliminate the long wait for concrete to cure; they give you a *stronger* structure.

Prestressed beams are made at a factory, where weather can't interfere with production. They are poured, stressed, cured, *tested*, and then delivered to the job the day you need them. Just set the beams in place and grout them in—they're installed, and *you* can move on to the next stage of work without delay.



and cut costs your concrete

wire and strand

Outstanding developments like American *Super-Tens* Wire and Type PS American Strand make the above advantages possible, because final stress allowable on these special wire products is approximately *five times* greater than that permissible with ordinary concrete reinforcement. This greater force binds the concrete together, prevents open cracks, gives the finished beam much better tensile strength with less reinforcing steel.

American Steel & Wire makes a high quality wire or strand for every successful method of prestressing concrete, and our engineers have extensive prestressing experience to draw from. For their help on your next job, just mail the coupon.

AMERICAN STEEL & WIRE DIVISION · UNITED STATES STEEL CORPORATION · GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN *Super-Tens* WIRE *and* TYPE PS AMERICAN STRAND

USS

UNITED STATES STEEL

American Steel & Wire
Room 842, Rockefeller Building
Cleveland 13, Ohio

I want all the facts about American *Super-Tens* Wire and Type PS Strand.

☐ Send me your free booklet, which contains technical data.

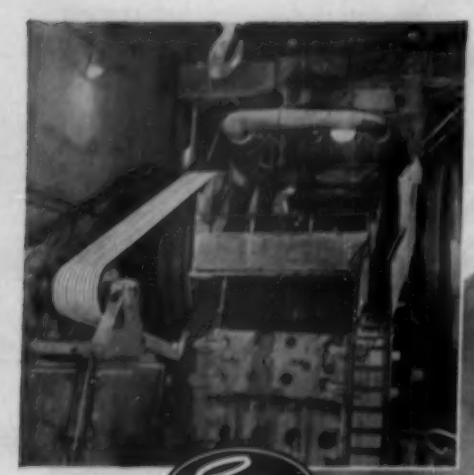
☐ Have your local representative call on me as soon as possible.

Name..... Title.....

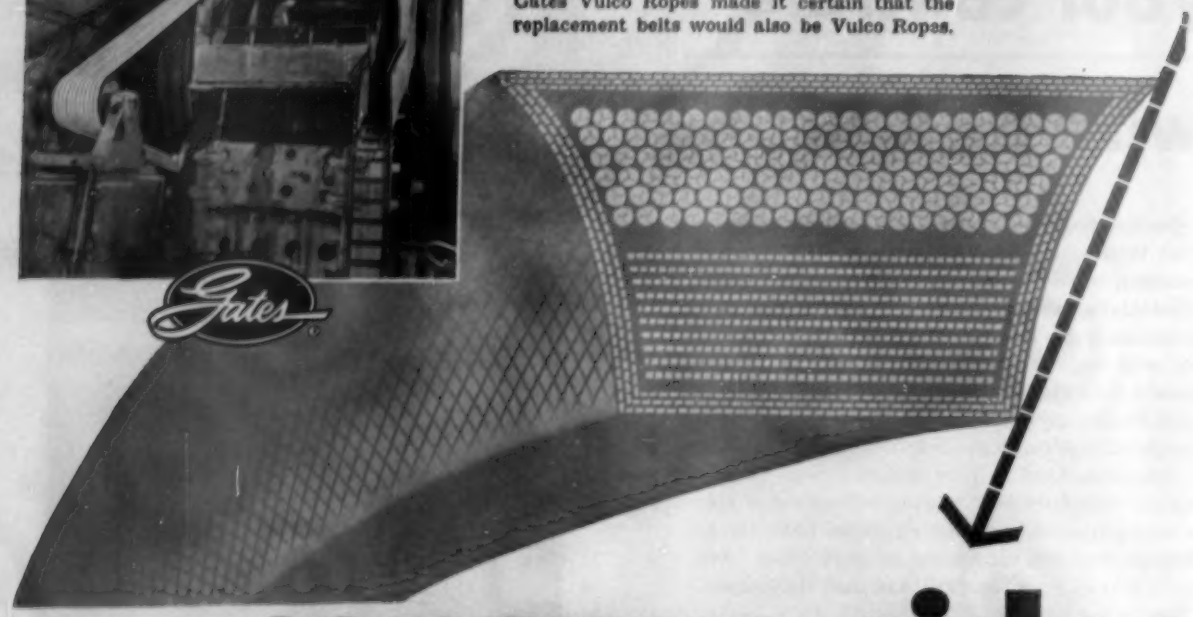
Company.....

Address.....

City & State.....

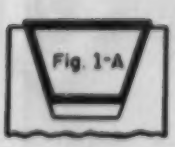


The drive on this huge jaw crusher was changed to Gates Vulco Ropes 12 years ago. 35 million tons of ore were crushed before the belts were replaced. The trouble-free performance of these Gates Vulco Ropes made it certain that the replacement belts would also be Vulco Ropes.



How concave sides cut V-belt costs!

Plants all over the world have made this discovery: Gates Vulco Ropes—the V-belts with *concave sides*—wear longer; cost less per year of service.



Here is the interesting reason why:

When the Gates Vulco Rope is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes full, uniform contact with the sides of the pulley. You get sure pulling power and *even distribution of wear.*

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.

It's easy to prove to yourself the value of concave sides

Simply bend a straight-sided belt (Fig. 2) and *feel* the bulge at the sides around the bend. You will quickly see why the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact shortens belt life...increases belt costs.

Cut belt replacement time and costs...specify Gates Vulco Ropes—the V-Belt with *concave sides* (U.S. Pat. 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

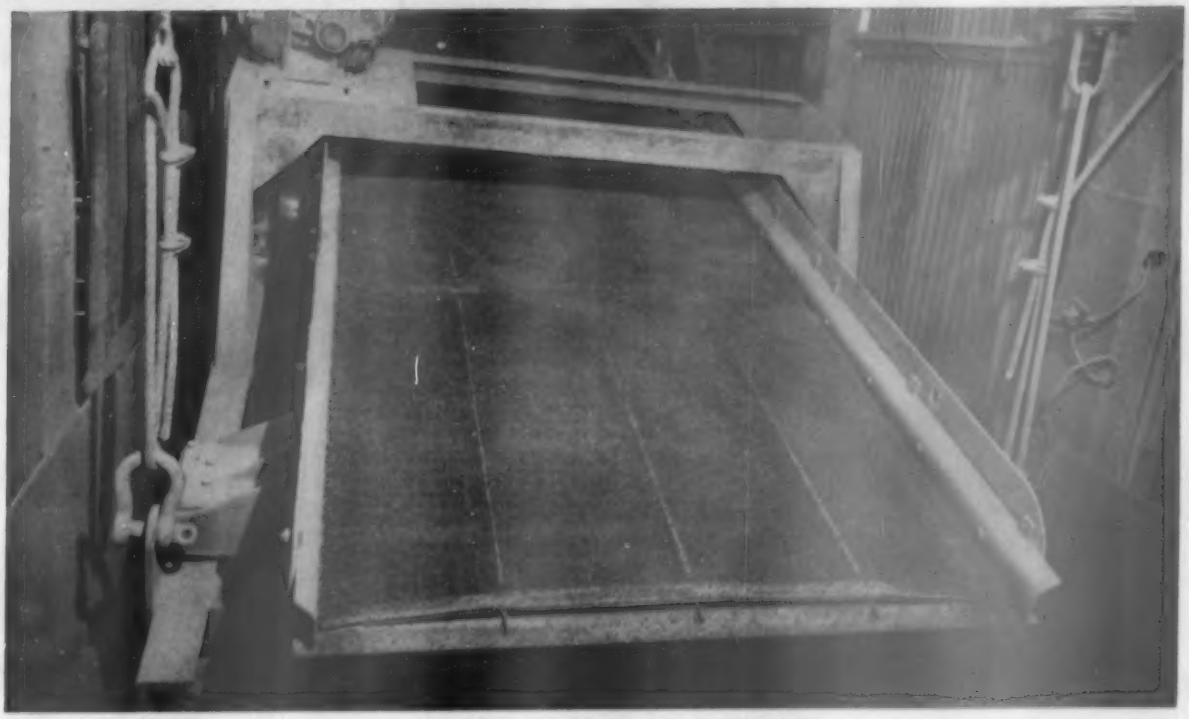
Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

VPA-35-B

GATES VULCO ROPE DRIVES

SECO SCREENS AG-LIME

PRODUCES 50 T.P.H. AT DOLOMITE GATES, N.Y. PLANT



Photographed on the job, Dolomite Products Company, Gates, New York

MORE PROOF SECO ENGINEERING PAYS OFF ON TOUGH ASSIGNMENTS

Ag-Lime screening may be a problem with some operators, but not with Dolomite Products Co.

The 5 x 12 single deck SECO vibrating screen pictured above, with a 20 mesh tension mounted wire cloth and ball tray attachment does this job in convincing fashion.

It's a *smooth* operator, too! SECO patented construction makes the difference. SECO's sharp, positive, fully-controlled true circular action drives the material through the meshes speedily and effectively with a minimum of blinding to produce approx. 50 T.P.H. of Ag-Lime to conform with Federal Government specifications.

Isn't this the kind of Ag-Lime screening results you're looking for, too? Write, wire or phone. No obligation.

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

FROM AG-LIME TO RIP-RAP YOU'LL DO BETTER WITH SECO VIBRATING SCREENS

Whatever your screening problem, there is a right SECO vibrating screen to do the job faithfully and economically. SECO builds over 350 models in single, double, triple and 3½ decks.

Send for Catalog #204

SCREEN EQUIPMENT CO., INC.

Buffalo 25, New York

Never leave dependability out of your fuel picture

A sailboat has no choice—it must depend upon an undependable wind for locomotion. Fortunately, you have a choice in fuels for your firing system. Select the fuel known for *complete* dependability—Bituminous coal! It's the one fuel which gives you:

Dependability of Supply—Bituminous coal provides, for centuries to come, an inexhaustible source of low-cost heat and energy. The vast Bituminous fields served by the B&O contain a great variety of outstanding coals for every purpose.

Dependability of Cost—Cost is kept low and stable thanks to the advancements made by modern mechanized mining. And coal is economical and safe to store.

Call on our Coal Technical Service! You will receive authoritative information on how to select the right Bituminous coal for your specific firing job . . . how to make the most of your fuel dollar. *Ask our man!*

Write: COAL TRAFFIC DEPARTMENT
BALTIMORE & OHIO RAILROAD
BALTIMORE 1, MARYLAND

BITUMINOUS COALS FOR EVERY PURPOSE

BALTIMORE & OHIO RAILROAD
Constantly *doing things* — better!

LINKING 13 GREAT STATES WITH THE NATION B&O

modern AGGREGATE PLANTS by TELSMITH

Relieve yourself of all technical details. Get a complete, flexible aggregate plant designed for high capacity and low-cost production, planned and equipped by a single skilled organization — Telsmith.

MP-17

Send for Bulletin No. 278

SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Songworks, Milwaukee

KOEHRING COMPANY Milwaukee 16, Wis.
Subsidiaries: JOHNSON
PARSONS · KWIK-MIX

BIG-PRODUCTION TEAM — Loading rock, Koehring 1½-yard shovel (above) is teamed up with Koehring Dumptors.®

Measure excavators by

price per pound of lifting capacity

In analyzing shovel operation, you will find that price per pound of lifting capacity on crane rating is also an excellent measurement of excavator value.

Remember, lift capacity is *work capacity*. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength, extra speed and stability to handle bigger loads faster with every excavator attachment.

Check Koehring lift ratings shown below — then ask your Koehring distributor to give you the figures on price per pound of lifting capacity.

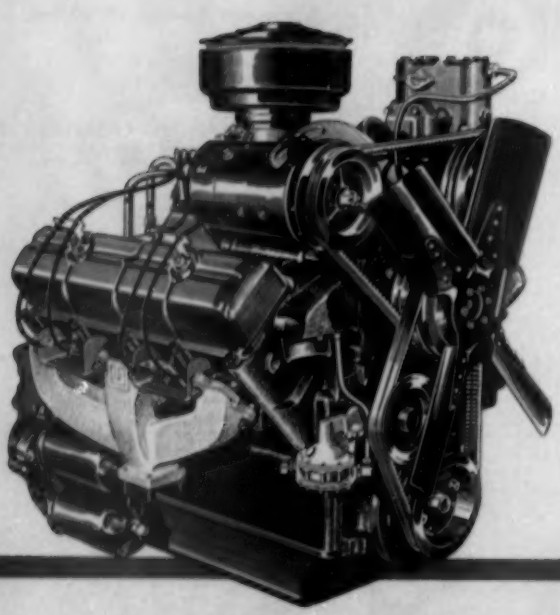
Compare for yourself:

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load)		PRICE PER POUND OF LIFT CAP.*
205 CRAWLER	½-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	?
205 ON RUBBER	½-Yd.	30,000 lbs.	25-foot boom at 12-ft. radius	?
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	¾-Yd.	30,000 lbs.	30-foot boom at 10-ft. radius	?
405 CRAWLER	1-Yd.	40,000 lbs.	40-foot boom at 12-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1605 CRAWLER	2½-Yds.	139,000 lbs.	50-foot boom at 12-ft. radius	?

Figures available on request—ask your Koehring distributor to see them.

100,000 MILE WARRANTY

now on all REO GOLD COMET ENGINES



When you buy Reo power, you buy *insured performance. Insured up to 100,000 miles or one year* by Reo's new iron-clad, factory-backed warranty.*

Reo's 100,000 Mile Warranty covers Reo's complete power range of rugged Gold Comet Engines—from gasoline and LP-Gas 6's to Reo's new 220 h.p. Gold Comet V-8's, the most powerful V-8 truck engines ever built.

Warranty covers engine models—255 OA, 292 OA, 331 OA, OH 160, OV 195, OV 220, OH 160 LPG, 255 OA LPG, 331 OA LPG. Available through Reo Factory Branches, Distributors and Dealers nationwide. Buy Reo . . . replace with Reo . . . and be *doubly* sure of performance.

** See your Reo representative today for complete information.*

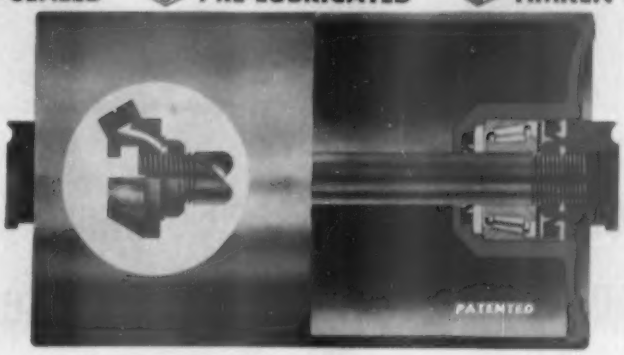
REO MOTORS, INC.

SUBSIDIARY OF **BOHN** ALUMINUM AND BRASS CORPORATION

WATCH REO ROLL

You Need... CONTINENTAL'S UST Idlers

CGC UNIT-SEALED CGC PRE-LUBRICATED CGC TIMKEN BEARINGS



Saves Grease!
Saves Labor!
Saves Belts!
Long Life- THE ULTIMATE IN MINIMUM MAINTENANCE

Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klozures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellant grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler for extended periods of time without relubrication for 1-2-3 years or longer depending upon the severity or character of conditions.

For detailed information on these idlers write for Bulletin RP-116.

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • KNOXVILLE • MEMPHIS CGC MANUFACTURERS
NEW YORK 17, NEW YORK

At Palisades Dam . . .

Belt reinforced with Du Pont "Cordura" still in top condition after 14 months' hard service

Reinforced with Du Pont "Cordura," this 15% slope belt hugs the idler for better troughing and training throughout its run.

Palisades Contractors, Palisades, Idaho, put the conveyor belt shown above through rugged 96-hour work weeks for 14 months—and it's still going strong.

The belt, reinforced with Du Pont Cordura* High Tenacity Rayon, carries 530 yards of earth per hour when in steady operation . . . can handle up to 1,800 tons per hour of large and small rocks, some up to 28 inches. Manufactured by Raybestos-Manhattan, Inc., the belt has needed little maintenance since its installation. Du Pont "Cordura" has *extra* strength . . . permits a belt that's thinner yet stronger. And the low stretch of "Cordura" reduces expensive downtime for take-up and resplicing.

Why not consider "Cordura" before ordering your next conveyor belt? Write us for names of suppliers . . . and send for your *free* copy of the new booklet "Mine & Quarry Facts About 'Cordura'." Address: Textile Fibers Department, Room 11506R, E. I. du Pont de Nemours & Co. (Inc.), Wilmington, Delaware.

*REG. U.S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

REG. U.S. PAT. OFF.

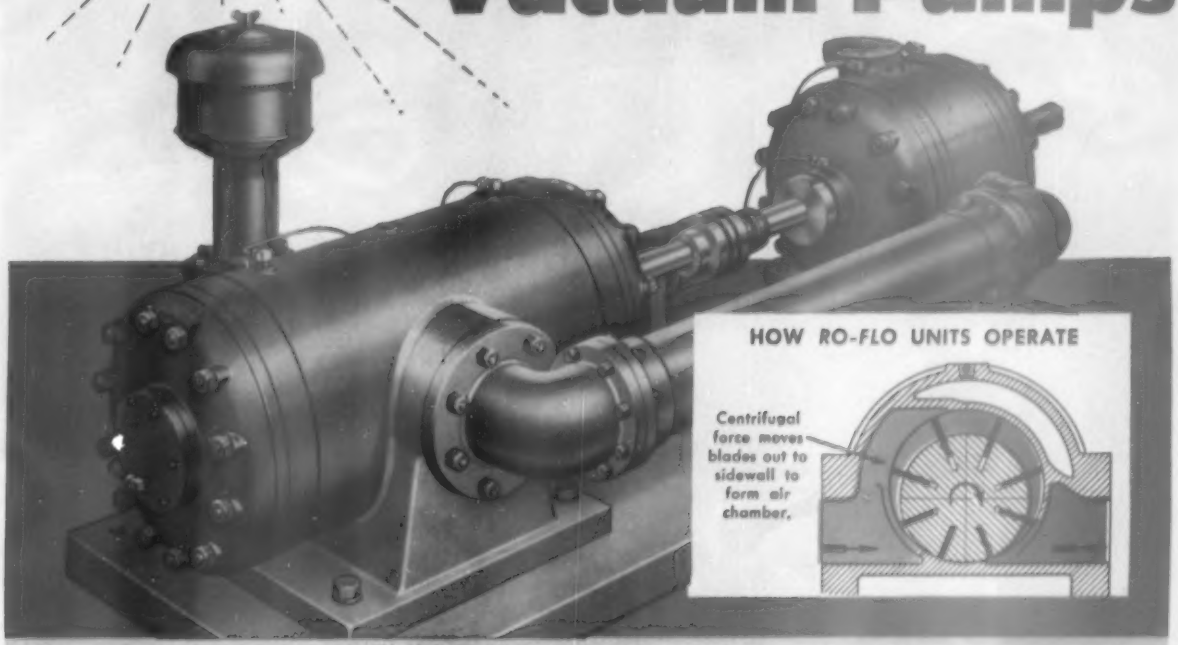
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

ALLIS-CHALMERS

NEW

100-lb Compressors

0.3-in. Mercury Absolute Vacuum Pumps



FOR SHOP AIR • DRILLING • GAS HANDLING • VACUUM PUMPING

Now—the *Ro-Flo* line is extended to include high pressure as well as low pressure units to give you three important advantages:

Constant efficiency — Automatic compensation for wear is inherent in *Ro-Flo* design. During operation, rotor blades slide against the sidewall to form air cells. Any blade wear from this action is compensated for by the rotating force which holds blades in contact with the cylinder.

Simple foundation requirements— The smooth rotation of the *Ro-Flo* unit cuts vibration and eliminates need for heavy, expensive foundations.

Low maintenance — Shock and vibration, inherent in reciprocating machines, is eliminated. This cuts maintenance.

Two-stage *Ro-Flo* compressors can be furnished in any of 12 sizes to handle from approximately 250 to 1800 cfm at pressures from 65 to 125 pounds gauge. Vacuum pumps furnished from 200 to 5040 cfm at 29.7 inches Hg vacuum, with shut-off of 29.9 inches Hg, referred, or better. Single-stage units are built for pressures up to 50 pounds gauge, 65 pounds absolute. Single-stage pumps for vacuums up to 28 inches Hg referred.

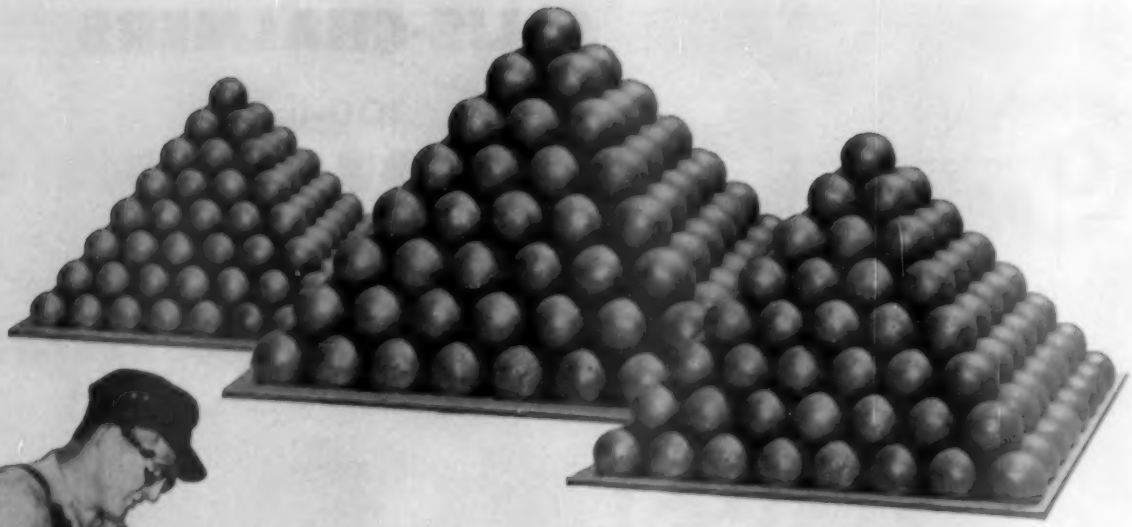
A-4569

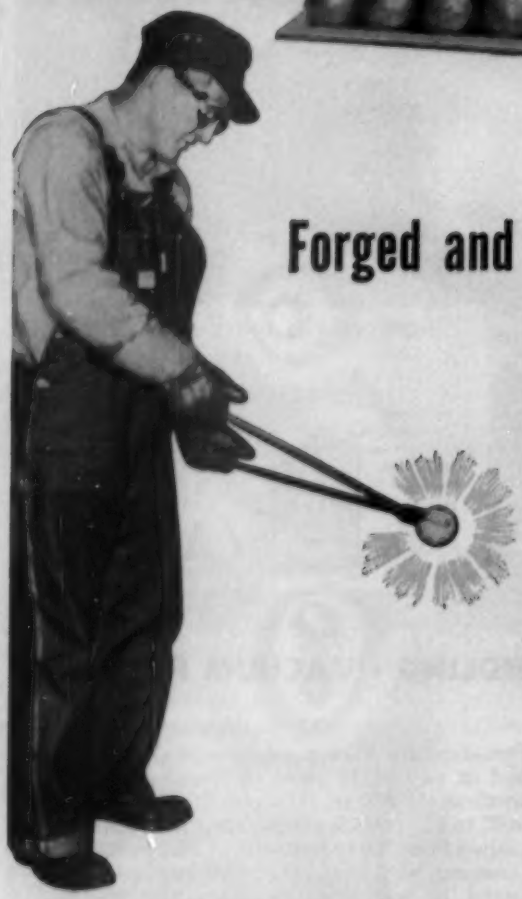
GET INFORMATION

Call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Ro-Flo is an Allis-Chalmers trademark.

ALLIS-CHALMERS





Forged and fortified for the long grind . . .

Ancient engineering "know-how" built the pyramids to last for the ages. For more than a quarter of a century at Sheffield, metallurgical skills and technological procedures have built up unrivaled "know-how" in the production of hard, tough grinding balls.

The finest of steel is fortified in the furnace with molybdenum, copper and other alloying elements in the precise proportions for deep hardenability. Automatic machines hot forge bars of this time tested alloy into near perfect spheres.

Next and most important, the hot forged Moly-Cop balls are slow cooled, reheated in pyometrically controlled furnaces to exactly the right temperature for carefully controlled quenching to attain a deep, uniform hardness.

There is no short cut in attaining the finer, denser grain structure of exceptional hardness and toughness necessary for longer and even wear.

Likewise, there is no short cut to grinding economy. If you want the lowest ball cost per unit ground – do what many major mills do–use Moly-Cop grinding balls.

SHEFFIELD

MOLY-COP

COPPER • MOLYBDENUM • ALLOY
GRINDING BALLS

SHEFFIELD STEEL

DIVISION
ARMCO STEEL CORPORATION
SHEFFIELD PLANTS: HOUSTON KANSAS CITY TULSA

Export Representatives: ARMCO INTERNATIONAL CORPORATION • Middletown, Ohio

Pit Owner Uses 7 INTERNATIONALS Since 1940; Two Engines Overhauled

UNUSUAL OPERATION. Entire production at the Hitch pit is shipped via water routes with two INTERNATIONAL TD-18As and dozers putting 800 tons on a barge in just two hours. Material is moved from dockside stockpile. Three to four barges are loaded daily.

Pit superintendent's report on TD-18As: *"We give them good care and good grease and they run for years"*

Arthur Hitch, Powell's Creek, Virginia, keeps three INTERNATIONAL TD-18A crawlers busy in his pit stripping overburden that averages 40 feet, loading 3200 tons of gravel into barges daily.

He's used seven TD-18As since 1940, and his pit boss, G. T. Starke, gives these reasons:

"They've been more successful in our operation than any crawler of equal size. You can't beat the way they stand up in the sand and mud—just two engine overhauls on seven crawlers in all that time. The rollers stand the gaff, too, these new types giving us about 5000 hours. Then there's the power—plenty of it at an economical operating cost. We give them good care and good grease and they run for years."

Sound like the kind of performance you need to clip costs in your pit or quarry? Then get all the facts by calling your INTERNATIONAL Industrial Power Distributor. He'll demonstrate the INTERNATIONAL crawler and equipment sized for your operation right on your job so you can make your equipment investments mean more production for less cost from now on. Call today.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

LONG-TERM USER. Three INTERNATIONAL TD-18As are currently used in the Hitch operation, stripping overburden averaging 40 feet, and moving gravel from stockpiles to barges.

INTERNATIONAL HARVESTER

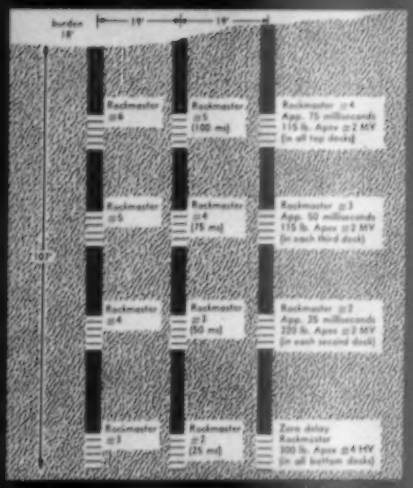
INTERNATIONAL INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD

Delayed "triple deck" blast cuts air snap, vibration...*and complaints!*

MISSION: Move an 18-ft. burden off a 107-ft. quarry face. Get good breakage—but no complaints.

METHOD: "Triple Deck" each hole and shoot each deck separately with ROCKMASTER® millisecond delays. Blast initiated at bottom of each charge for maximum confinement. (Note movement at ½ second, lower right.)



Blast uses six ROCKMASTER delay periods in three 107-ft. holes. 750 lbs. of Apex® quarry and stripping explosives loaded in separate decks in each hole

At full second, entire burden is in motion. Toe leading . . . excellent control. Sound muffled . . . little vibration.

Low final muck pile . . . well spread. Excellent breakage . . . little work for the drop ball.

When you're blasting in the middle of a heavily populated residential area, you *know* the neighbors are listening. Good public relations are a must—but so are good breakage and control!

Union Building and Construction Co., Clifton, N. J. solved this dilemma with ROCKMASTER®. Working hand-in-hand with their Atlas representative, they developed this unique method of "deck initiation." It takes *extra* advantage of all the benefits of delayed-action ROCKMASTER electric blasting.

Ask *your* Atlas representative about ROCKMASTER—the modern blasting method that gives you quiet efficiency, saves explosives, and adds a "good neighbor policy" for a bonus.

GET "BETTER BLASTING"

If you are not already getting this informative periodical, let us put your name on our mailing list today.

(P. S.—Tell us who else in your organization should get "Better Blasting", too.)

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in Principal Cities

New 30" x 26" Rolls

Greatest secondary crushing capacity ever offered in a plant of this weight

Giant Capacity

Gives you far more fine crushed material per hour. Has the ideal crusher for the big 4' x 12' screen

Universal 880 Senior "R"

10" x 36" Jaw • 30" x 26" Roll Crusher • 30" Conveyors • 48 sq. ft. Screen

You want a plant that delivers screened and crushed material at a record rate and produces it at lower cost per ton. This is it!

The 880 Senior "R" teams a huge 48 sq. ft. screen with the biggest roll crusher ever offered, big, rugged 30" conveyors and a high capacity 1036 jaw crusher to give you a plant unequalled for high production in its weight class.

It's easy and economical to operate, too. You can adjust the jaw discharge quickly while standing on the ground—insures full control over primary crushing at all times. Dual clutch control on delivery conveyor speeds up truck loading of finished material. Plant operator or truck driver can control conveyor discharge.

Add to this—trouble-free V-belt drive, head-drive front delivery conveyor, extended operator's platform, plus the dozens of other advanced Universal features . . . and you've got a big, profitable, easy-operating plant that can't be matched. Write for illustrated bulletin, today!

Universal Senior 880 "R"—designed to meet highway weight limitations

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

617 C Avenue N.W., Cedar Rapids, Iowa

A Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

Testing • Benificiation • Separation

Visual Examination identifies and classifies various materials . . . serves as a basis for planning tests.

Crushing Tests show when the minimum amount of work has been done to meet size specifications.

Screen Tests tell when proper size has been reached for material specifications . . . can reduce crushing and grinding costs.

Grinding Tests determine the size and type of unit to do the grinding job.

DECO Testing Laboratory Helps Producers Meet New, More Rigid Specifications

A thorough laboratory test is a "first" for any operator with an impurity or size separation problem caused by material specifications.

If you will send us a representative sample of your material and describe fully your objectives, we will make a preliminary examination and then report to you. Your problems interest us personally. With our many years of experience we may be able to help you.

There is no cost to you on this preliminary examination. We would appreciate the sample being sent to us prepaid (by parcel post if convenient). We hope you will say, "Let's see what they can do for us!"

"The firm that makes its friends happier, healthier and wealthier"

DENVER EQUIPMENT CO.

1400 17th St. Phone CHerry 4-4466 Denver 17, Colo.

DENVER • NEW YORK • CHICAGO • EL PASO • SALT LAKE CITY
TORONTO • VANCOUVER • MEXICO, D. F. • LONDON • JOHANNESBURG

Complete laboratory facilities and commercial Denver Equipment for crushing, screening, grinding, scrubbing, classification, pumping, separation, flotation and gravity concentration, sampling, thickening, filtering, and drying. Portable and package plants.

Flotation Tests tell best reagent combination, flotation, time, maximum percentage and grade of recovered product in full scale plant operation.

Settling Tests which duplicate field conditions determines settling rate, clarifying time and equipment that is required to process various products.

Another
ALL
MARION
Plant
Three MARION machines carry big work-loads at this eastern cement plant. A MARION 111-M loads 10 cu. yd. truck trailers like clockwork, digging along a 95-foot bank. Two MARION 43-M machines with 65-foot booms handle a variety of clamshell and crane work. Learn what MARION-OSGOOD-GENERAL equipment can mean to the future of your quarry — write for Bulletin 402-A

MARION • OSGOOD • GENERAL

MARION POWER SHOVEL CO. • MARION, OHIO, U. S. A.

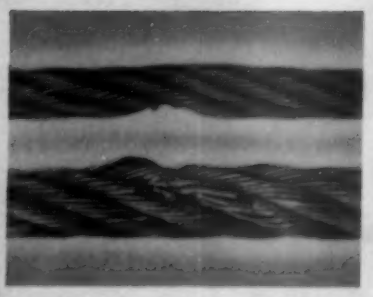
A Subsidiary of Merritt-Chapman & Scott Corporation

POWER SHOVELS FROM ½ TO 60 CUBIC YARDS
PILE DRIVERS • WALKING DRAGLINES

DRAGLINES • CLAMSHELLS • CRANES • BACKHOES
TRUCK CRANES • MOBILCRANES • LOG LOADERS

Your Confidence Is Justified Where This Flag Flies

Tuffy tips on preventing



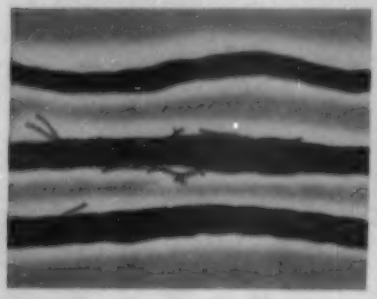
These two photos show what happens when rope is run over or struck by a hard object and crushed. The damage to the strands greatly reduces the service life so carefully built into the rope.

Sudden release rebound from an overstressed condition may often cause birdcaging. Throwing a loop into the rope is also a major cause of birdcaging. Lang Lay ropes in particular are vulnerable to this abuse.

Severe corrosive water conditions caused rust and corrosion to produce a one-strand break in this rope. Lubrication during the time the rope was in service would have retarded the damage . . . added greatly to the rope's life.

If broken in improperly, high strands like these may result. When installing, make sure that the fabricated relation between *strand with strand* and *strands with core* are not changed.

Nailing a wire rope through the core often causes many undesirable results. The wires and the core are badly damaged. A high strand may develop near the end or many feet away.

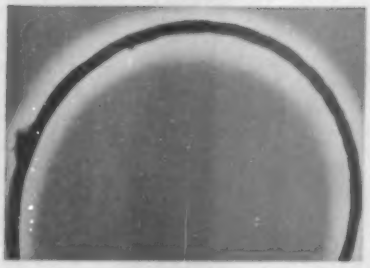


Here are three types of open kinks, all resulting from mishandling of wire rope. Guard against kinks by winding rope properly on the drum, and *never* pull a loop smaller, always enlarge it then straighten out the rope.

The start and finish of doglegs; the end being the point when all the wires on one side of the rope were worn through. Anything, such as a pulled loop, that causes a permanent bend or "set" will result in a dogleg.

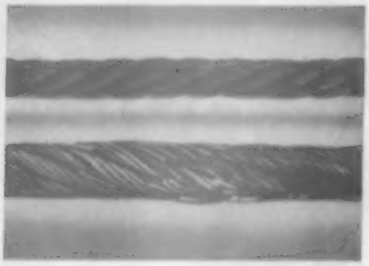
While different wire rope is constructed to resist abrasion to different degrees, improper use leads to injury. Watch for abrasion and when it begins to show locate the point where it is occurring and correct the cause.

damage to *Wire Rope*



When a popped core occurs, continued use causes the rope lay to lengthen out considerably. This displacement of the core is usually caused by load tension being suddenly removed from the rope.

Here is an example of excessive pinching in the sheave grooves. This rope lasted through only 1½ hours of service. To prevent pinching, make sure grooves are not worn deep and that the bearing surface is sufficiently large.



Excessive drum crushing like this occurs at points of cross-over or when rope is wound unevenly. Check for even winding of each layer on the drum to prevent crushing of this type.

Put the Knowledge of Specialists to Work on Your *Wire Rope* Problems

Their years of field-testing experience and solutions arrived at and proved both in the field and in our outstanding wire rope laboratory are yours to make use of whenever a rope problem confronts you.

In addition to standard wire ropes, Union Wire Rope specialists have produced a family of wire ropes for special purposes. Ropes that give you the construction, type of steel and characteristics best suited to each particular job for which each of the Tuffy Wire Ropes is especially designed and constructed.

The Tuffy Ropes they have developed make ordering easy and *sure*. Next time you want wire rope, just...

Say Tuffy—No Need For Complicated Specifications

Tuffy Scraper Rope

Mount a reel on your scraper and move more yardage per foot. Flexible to resist sharp bends, stiff enough to resist looping and kinking.

Tuffy Dragline

Rides smooth on drums and hugs the drum when casting. Extra flexible, yet constructed to give maximum abrasive resistance.

Tuffy Dozer Rope

Mounted on special 150' reel that lets you use rope you now throw away! Increases service life and reduces down-time. 1/2" and 9/16".

Tuffy Slings & Hoist Line

A hoist line that gives you extra service life. Slings of 9-part machine-braided wire fabric fight kinking — a matched team of balanced performers.

Your Union Wire Rope Distributor Is Good At Solving *Wire Rope* Riddles. When you have a wire rope problem, give your Union Wire Rope distributor a call for hurry-up service. Chances are you'll find he has the correct answer at hand—because part of his job is figuring out how your equipment can give you the best operation, at the lowest operating cost! Feel free to call on him anytime.

union *Wire Rope* **corp.**

2156 Manchester Avenue, Kansas City 26, Mo.

2-C *Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric*

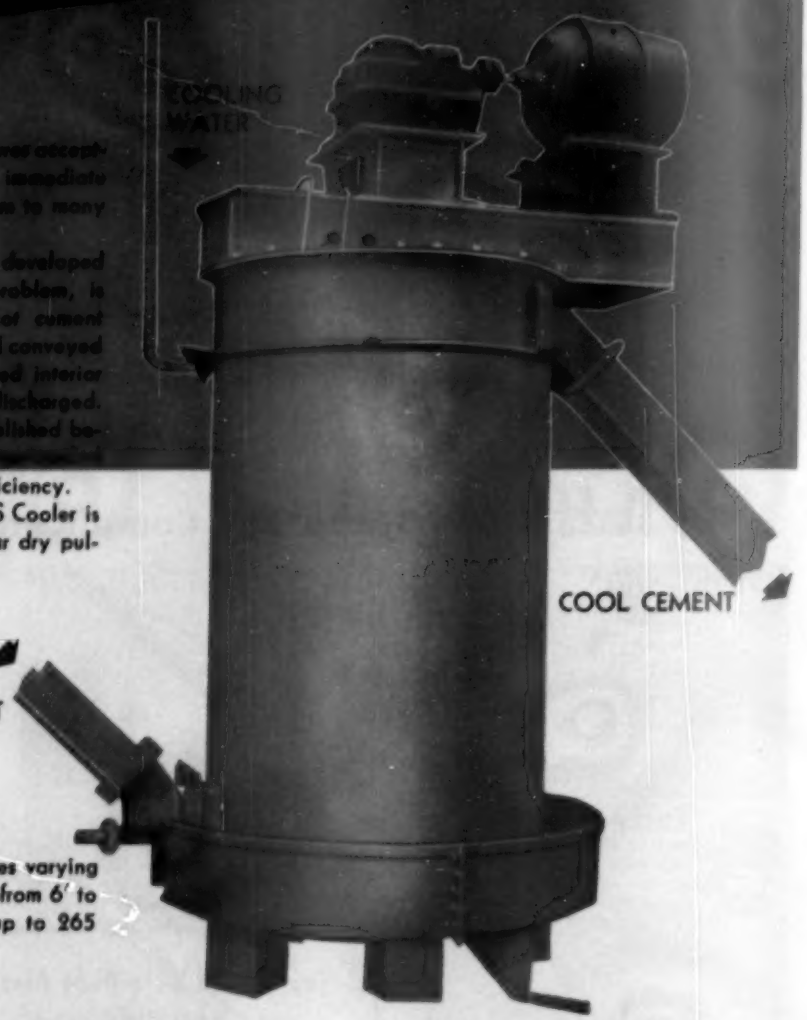
For Cooling Hot Cement

FLS

Cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging is an important problem to many cement manufacturers.

The FLS Cement Cooler, developed especially to overcome this problem, is externally water-cooled, the hot cement being introduced at the base and conveyed in a thin layer along the cooled interior surface to the top, where it is discharged. Thus an intimate contact is established between the cement and the cooled surface, assuring high cooling efficiency.

In addition to cement, the FLS Cooler is applicable to many other similar dry pulverized materials.



FLS Coolers are furnished in sizes varying from 3' to 6'6" in diameter and from 6' to 18' in height, with capacities up to 265 barrels of cement per hour.

F. L. Smidth & Co., A/S
Vestergade 33,
Copenhagen K, Denmark

F. L. Smidth & Co.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co. (Bombay) Ltd.
42 Queen's Road
Bombay, India

What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

April, 1955

A proposed 100-mile conveyor belt, to carry coal and iron ore between Lake Erie on the north and the Ohio River on the south, is the center of a debate dating back to 1948. Pushing the proposed "rubber railroad" is Riverlake Belt Conveyor Lines, Inc., of Akron, Ohio, along with some 14 potential suppliers of the estimated $250 million conveyor belt. A number of large steel and power companies have also been supporting the proposed conveyor system, anticipating long-term savings of $20 to $30 million annually from potentially lower shipping costs on the coal and ore they use. The 11 coal and ore-hauling railroads in Ohio are strongly opposed to the proposal, as they stand to lose an estimated $100 million worth of business annually. Proponents of the belt conveyor system claim their hauling rates would be about 25 percent below rail rates, and, after the St. Lawrence Seaway opens, could make Ohio the nation's key metal-working state. Approximately $300,000 will have been spent for "engineering studies" by the time the legislative battle is over, to show that the conveyor will or won't work.

Weather forecasting may be handled by an electronic "brain" in the future, according to federal meteorologists. A unit, known as IBM 701 Electronic Data Processing Machine, or the "Seven-Oh-One," is said to be capable of absorbing huge quantities of atmospheric information, solving complex mathematical equations, and even drawing maps. It is expected to be furnishing daily nationwide, 24-hr. to 48-hr. weather predictions within a year or so, and eventually provide 5-day and 30-day weather outlooks, with much greater accuracy and detail. Improved forecasts would be a boon to all, particularly construction firms, farmers, aggregate plant operators, etc., who require fast, detailed and accurate weather guides for day-to-day operations.

Heavy construction awards, nationally, totaled $3,111,607,000 for the first 10 weeks of 1955, or 58 percent higher than the low volume in the 1954 period and 2.2 percent below the record high in 1953, as reported by **Engineering News-Record.** Private construction, sparked by the housing boom, totaled more than $1.2 billion, more than double last year's volume. State and local construction contracts totaled $850 million, or 16 percent ahead of 1954, for the first 10 weeks of 1955, and federal construction totaled $319 million, up 79 percent over the same period of the previous year.

A bill increasing New Mexico's allowable truck weights to among the highest in the nation was approved by the State Senate. The bill allows all trucks the 20 percent tolerance formerly permitted only to haulers of unprocessed natural products of New Mexico. The single axle limit was raised from 18,000 to 21,600 lb., and tandem axle limits are increased from 32,000 to 34,320 lb. The bill also permits an extra trailer behind a truck-tractor. The new axle weight rate is said to be exceeded only by the Michigan limitation, which allows 110,000 lb. on designated highways, and Rhode Island, which permits 88,000 lb., but requires the weight be carried on at least six axles.

A silicon treatment, known as Sylflex, has been developed by Dow Corning Corp., and is being used to impart water-shedding qualities to leather footwear. The leather is treated in the tanning process with the silicone product, which is said to coat the leather fibers without clogging the pores through which the leather breathes. Silicones have been used in paper eye-glass cleaners, rubber which does not become stiff at sub-zero temperatures, and in oil that does not burn away at super-heats. An anti-foaming agent made of silicones is sometimes used to relieve cows who have become bloated from eating the wrong grass.

Kansas truckers entering Missouri are required to register with the Missouri Public Service Commission and display a Missouri license while traveling in the state. The move is a retaliatory one by Missouri, following unsuccessful meetings to reach an accord between the two states. Commercial vehicle operators of Kansas have had free use of Missouri highways for several years, while Missouri truckers have been required to pay a ton-mile tax for using Kansas highways. A gasoline tax was also charged to Missouri truckers on all fuel carried in the vehicle in excess of 20 gal. when operating in Kansas.

Theft of 9000 ft. of "hot" copper cable was recently reported at the Carbon Limestone Co. plant at Hillsville, Penn. George H. Donaldson, vice-president in charge of operations, described the thieves as "highly skillful or very dumb and very lucky." To reach the copper wire, which ran in three parallel lines from pole to pole, the thieves had to reach through two lines of aluminum wire on a lower cross-bar. In addition to the "hot" cable, a 2000-ft. reel of similar wire was stolen. Two smaller thefts of wire have occurred at the plant in the past several years.

Use of sand and stone from the Beaufort geological system running through inland areas of Natal, the Cape Midlands, and the central Orange Free State, has caused cracking of concrete beams in bridges and houses, according to the National Building Research Institute in South Africa. As reported in **Chemical and Engineering News,** institute scientists have found that some reinforced concrete beams had sagged by as much as 2 in. at the center of a 30-ft. span. As far as known, this is the first report of this kind from any other part of the world.

National Potash Co. has been formed by Freeport Sulphur Co. and Pittsburgh Consolidation Coal Co. to mine potash near Carlsbad, N. M. The project, including mine, plant and facilities is expected to cost approximately $19,000,000. Production is scheduled to start in 1957, with an annual capacity of 400,000 tons of potash salts. Richard C. Wells, vice-president and controller of Freeport, is president of National Potash. Thomas C. Ferguson, formerly vice-president of one of Pittsburgh Consolidation's division is operating vice-president of the new company.

A graduate fellowship for 1955-56 has been offered to students with a bachelor's degree in chemistry or chemical engineering by Ohio State University, Department of Mineralogy. The course will include high temperature phase equilibrium studies of silicate minerals.

THE EDITORS

APPROVED

in

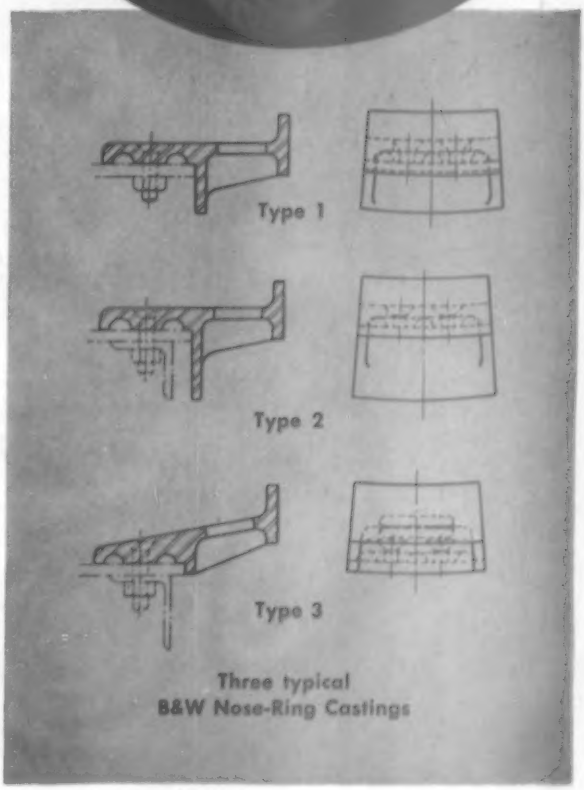
PUNISHING SERVICE

...by More Plants for More Kilns

B&W ALLOY NOSE-RING CASTINGS are establishing a record of fast-growing acceptance by cement plants across the country and abroad. Recent installations have increased the total to 189 sets—or 7062 pieces—now in operation on the discharge end of rotary kilns in leading cement, lime, and dolomite plants.

Sparking this acceptance trend are important cost-saving features characteristic of these light and strong B&W Castings, resulting in improved kiln performance. These features include:

- Longer brick life and continuous operation by elimination of kiln shell "belling."
- "Feathering-down" of end of kiln shell due to oxidation is overcome, since shell is protected from direct flame.
- Low installation cost, due to small size and light weight of B&W Castings.
- Protective flange on casting permits use of low-alloy steel bolts.
- Spare part inventory reduced as same casting will fit kilns varying up to two feet in diameter.



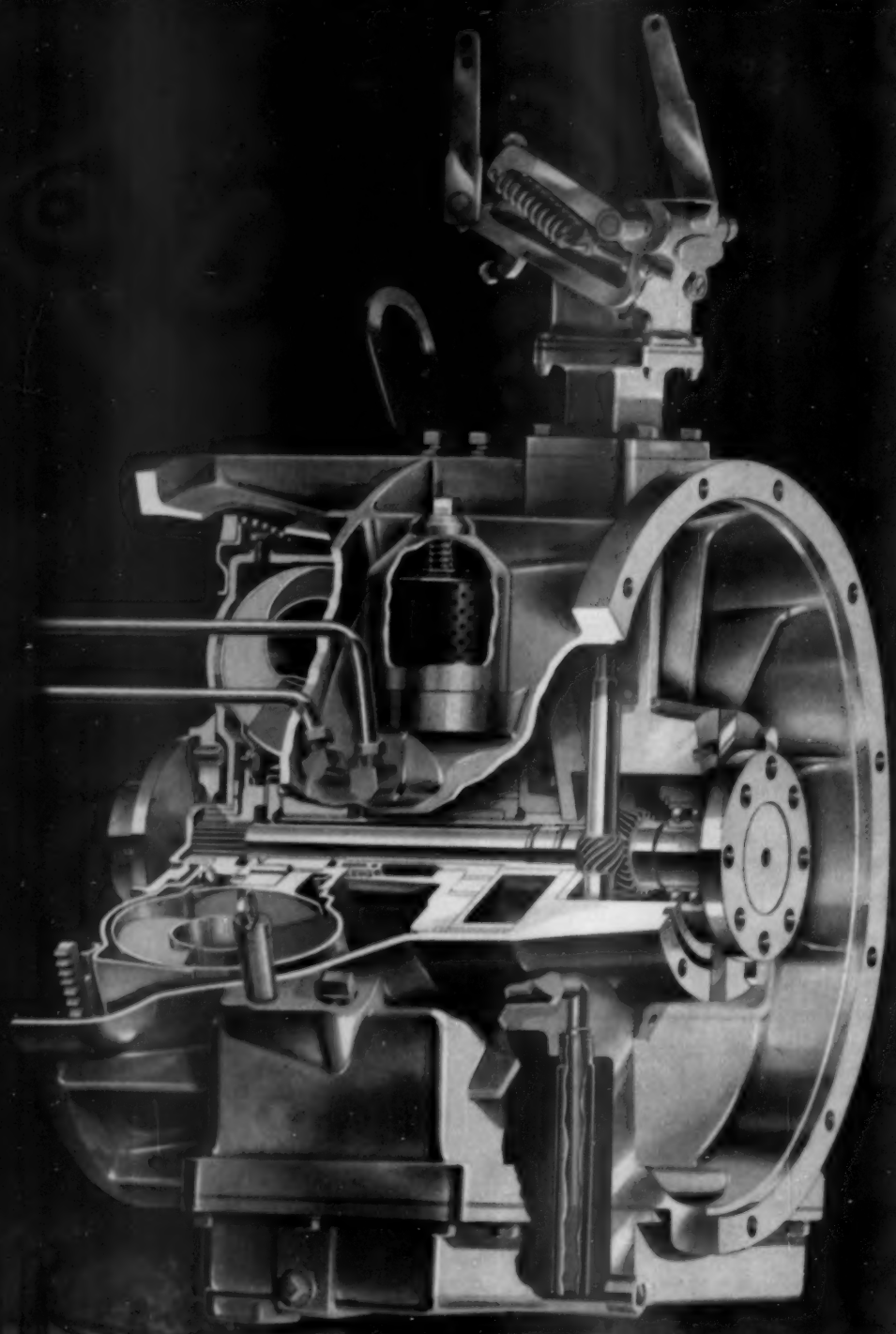
Three typical
B&W Nose-Ring Castings

Write for Bulletin SDM-12.
The Babcock & Wilcox Company,
Process Equipment Dept.,
Barberton, Ohio.

BABCOCK & WILCOX

S-420

OUTPUT UP-COSTS DOWN



with the new CHRYSLER Industrial Torque Converter

Now available for installation on Chrysler Industrial Engines

Chrysler—famous the world over for truly engineered performance—offers a New Industrial Torque Converter designed and built to fill the intermittent need for greater torque within the recommended power range . . . employed in any application.

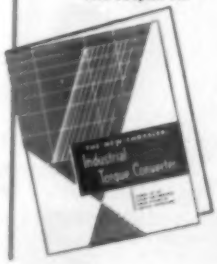
The New Chrysler Industrial Torque Converter provides torque multiplication of 2.6 with almost 97% efficiency in coupling range. For the first time here's a torque converter with provision for a *built-into-the-housing* speed control device. This feature, optional equipment, automatically adjusts torque converter speed to variations in road and load conditions, making it unnecessary to rely on less sensitive engine governor. Dual cooling, liquid and direct-air, dissipates torque converter heat faster enabling more efficient operation.

The engines powering your equipment now may lack the torque they occasionally need. Here's a way to solve that added requirement *without* installing an otherwise unnecessarily large engine. Check into these and the many other advantages of the New Chrysler Industrial Torque Converter. It's two-thirds the weight of cast iron competitive units which include provision for both transmission and power takeoff clutch. Its cost is amazingly low.

CHRYSLER
INDUSTRIAL
TORQUE
CONVERTER

PRODUCT OF MARINE & INDUSTRIAL ENGINE DIVISION CHRYSLER CORPORATION TRENTON, MICHIGAN

WRITE FOR INFORMATION FOLDER
Simply fill out, clip and mail this coupon to:



Chrysler Industrial Torque Converter
Dept. 544, Industrial Engine Division
Chrysler Corporation
Trenton, Michigan

YOUR NAME

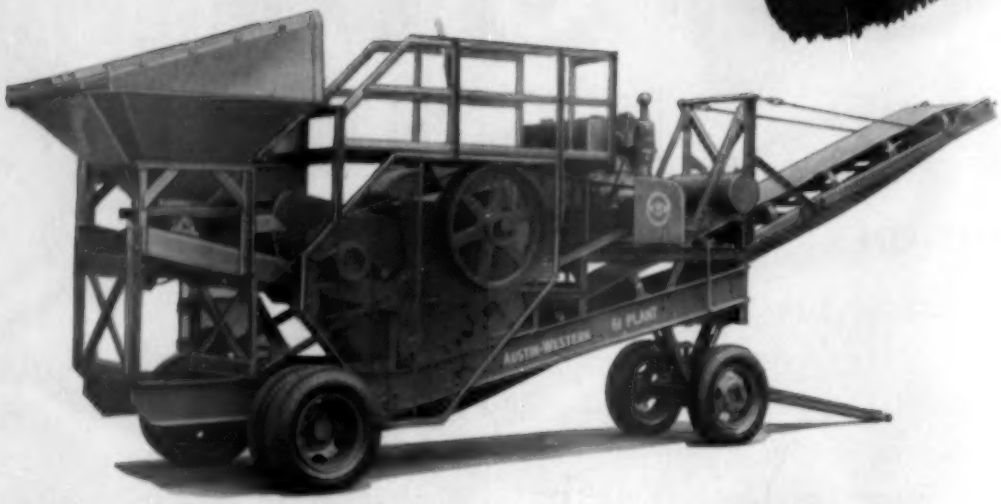
COMPANY NAME

ADDRESS
NUMBER AND STREET

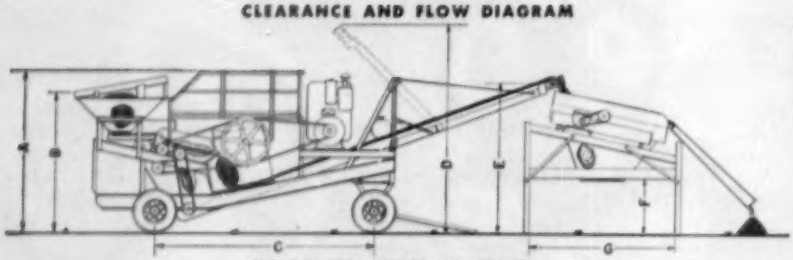
CITY ZONE STATE

AUSTIN-WESTERN
PORTABLE CRUSHING PLANT

"61"



CLEARANCE AND FLOW DIAGRAM



CLEARANCES—MODEL "61" PLANT

A—Traveling Height.....11'-2"	E—Height at Center of Head Drum.....10'-5"
B—Loading Height..... 9'-8½"	F—Height Under Screen Mounting Frame to Ground..... 3'-8"
C—Wheelbase .....15'-0"	G—Length of Screen Mounting Frame.....Approx. 10'-0"
D—Height with Conv. Folded .....14'-5"	

COMPARE
then you'll specify
AUSTIN-WESTERN

DESIGNED FOR SMALL PROJECTS

Austin-Western "61" Portable Crushing Plant is especially engineered for the smaller projects such as county, township and municipal road building and maintenance. Because of its sturdy construction and stability, the "61" is adaptable to use wherever needed. When equipped with a 1024 Jaw Crusher the entire plant, less power, weighs approximately ten tons. The heavy welded channel frame requires no jacks. Dual rear tires give the plant great stability. The plant is equipped with a 24" x 26' channel frame delivery conveyor having a discharge height of 10'-5". With an Austin-Western "61" Plant you have greater portability, speedier set-up and higher production.

Welded steel plate crusher frame for high strength without weight of cast steel frame.

Machined steel toggle plate for absolute protection of crusher.

Inclined positive-throw type vibrating screen.

All bearings are anti-friction type.

Dual wheels are used on rear for added stability.

All drives are V-belts and fully enclosed gears.

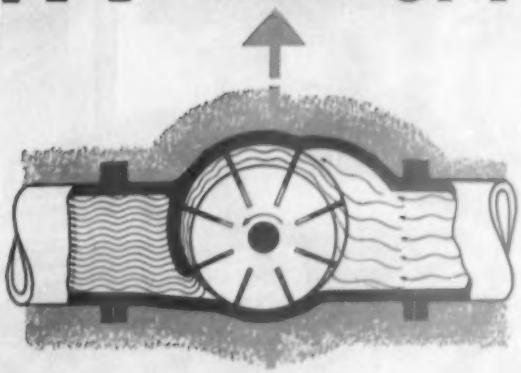
DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

Austin-Western
CRUSHING, SCREENING and WASHING EQUIPMENT

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

Construction Equipment Division

Growing Plants need PLENTY of AIR!



As abundantly demonstrated in thousands of successful installations, the simplest, most economical and most reliable source of compressed air for all pnuematic plant services is the Fuller vane-type Rotary Compressor.

This compressor has an irreducible number of moving parts—rotors, blades and bearings—and for this reason it is ideally adapted for continuous service in out-of-the-way locations without attention.

With direct-connected motor drive and operating with incredible lack of vibration, these compressors run for days on end without even being seen, much less inspected.

When you need such performance, it will pay you to specify Fuller Rotaries—for pressure up to 125 psig. and capacities to 3300 cfm.

Detailed information on design characteristics, and typical applications will be forwarded promptly on request.

FULLER COMPANY, Catasauqua, Pa.

1317
C-261

GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY

Chicago · San Francisco · Los Angeles · Seattle · Birmingham

Fuller

. . . . pioneers in harnessing AIR

Get Both
bearing features

fully enclosed and protected

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

. . . yet easy to grease

You can lubricate the bearings without dismantling the motor. Pipe-tapped holes in the bearing housings at three points provide both means for inserting new grease and a means of flushing out old grease.

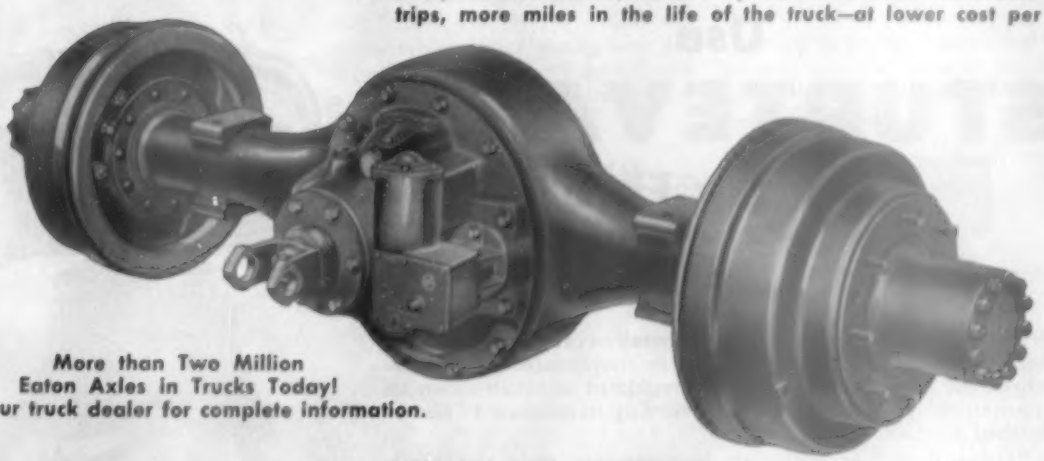
Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4609

ALLIS-CHALMERS

Eaton 2-speed Axles Turn Time into Money for Truck Operators

Eaton 2-Speed Axles may be the difference between profit and loss for those hauling jobs where time is a critical factor. They give trucks full pulling power for off-the-highway operation, plus the speed to make time on the open road. Because Eaton 2-Speeds reduce strain and wear on engines and power transmitting parts, and permit engines to run in their most efficient operating range, trucks are on the job—not in the shop. Eaton 2-Speeds give trucks greater maneuverability—an important factor in maintaining schedules in today's traffic. Eaton's exclusive features provide axles with greater stamina, hold maintenance to a minimum, assure maximum earning ability. Specifically: by supplying the right gear ratio for every road and load, Eaton 2-Speed Axles mean more and faster trips, more miles in the life of the truck—at lower cost per mile.

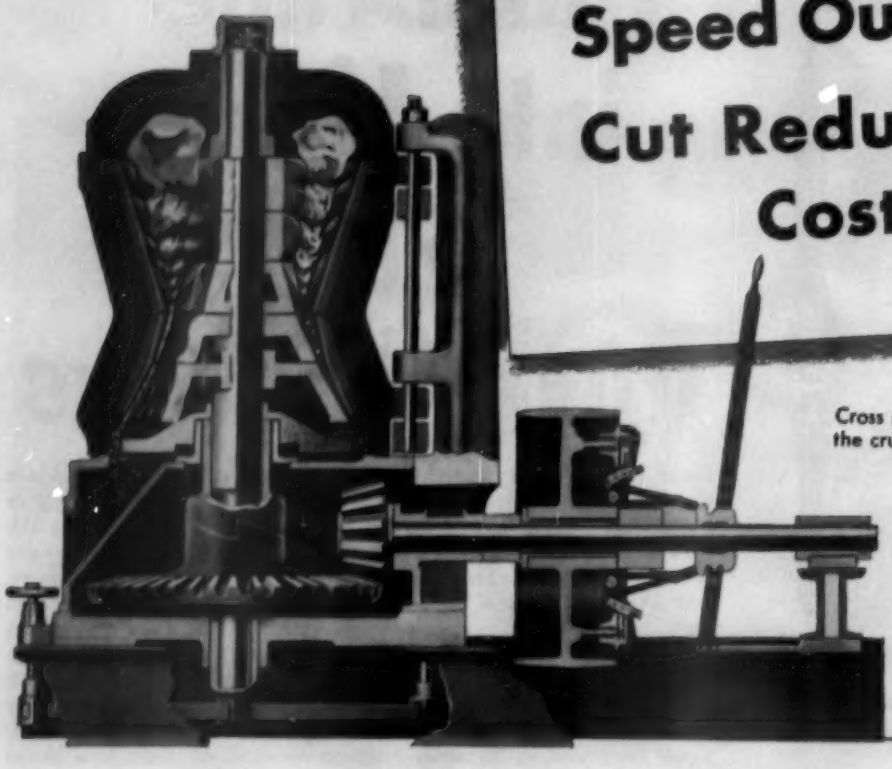


More than Two Million Eaton Axles in Trucks Today!
Ask your truck dealer for complete information.

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

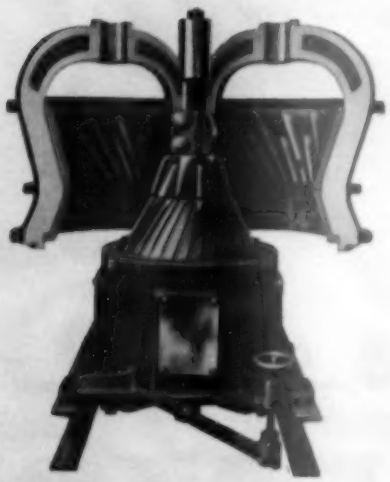
PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Here's How to Speed Output... Cut Reduction Cost



Cross section view illustrating the crushing action.

Use STURTEVANT Rotary Fine CRUSHERS



With the Sturtevant Rotary Fine Crushers you can crush or granulate to even sizes without excess dust. By simply turning the handwheel, the crusher can be quickly regulated to crush down to approximately ¼" and finer, or opened up to produce 1" size of finished product.

"Open-door" accessibility permits fast, easy, thorough cleaning.

Sturtevant Rotary Fine Crushers crush fast... do not clog. Available in output capacities from 1 to 30 tons per hour.

Sturtevant Mill Company

102 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of

CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and
EXCAVATORS • ELEVATORS • MIXERS

Oliver Super 77 with hydraulic front loader

Presenting . . . the Brand-New

OLIVER SUPER 77 and 88

Super new power . . . features . . . value!

Here are the newest tractors in the industrial field—the Oliver Super 77 and 88!

Here is power like never before. And both Supers offer a choice of gas or diesel engine. The gas engine has a compression ratio of 7.0:1 to give you more power on less fuel. And the diesel is a full diesel—starts and runs on diesel fuel alone. Pick the fuel that fits your work, saves the most.

Here are tractors that have the features you want—five working speeds, one road speed; long-lasting double-disc brakes; easy ball-type steering; comfortable rubber spring seat; Independent Rear Power Take-Off and many other advancements found only on Oliver Supers.

These tractors take a variety of equipment . . . are useful on hundreds of different jobs. Test them yourself. Find out why an Oliver Super is your best buy for power, features and value—now, and for years to come! See your Oliver Industrial Distributor for a demonstration.

THE OLIVER CORPORATION

400 W. Madison Street, Chicago 6, Illinois

A complete line of industrial wheel and crawler tractors

Oliver Super 88 with HydroTrencher. This trencher has a ½-yard capacity and quick, positive hydraulic control. It digs to 12 feet, loads to 12 feet.

They Move Mountains...and ask for more!

Twenty million tons...a mountain of rock and gravel in California, plus one of iron ore in Minnesota. Sixteen years of hard, rough service and still asking for more!

It's hard to believe that any piece of machinery could last under those conditions and still have at least eight more years of life. But, Rex Belt Conveyor Idlers did exactly that...hauled mountains of material under the roughest type of service, and are still going strong.

The proof? We pulled an idler from the conveyor and took it apart. Physical measurements show it has at least eight more years of life. Find it hard to believe? We can prove it! We'll be happy to send you the complete data.

This story is typical of the service you can expect from Rex Belt Conveyor Idlers and other products of CHAIN Belt Company. For equipment that speeds production, improves efficiency and reduces costs, the specialized services and products of CHAIN Belt may be able to help you. Write CHAIN Belt Company, 4649 W. Greenfield Avenue, Milwaukee 1, Wisconsin.

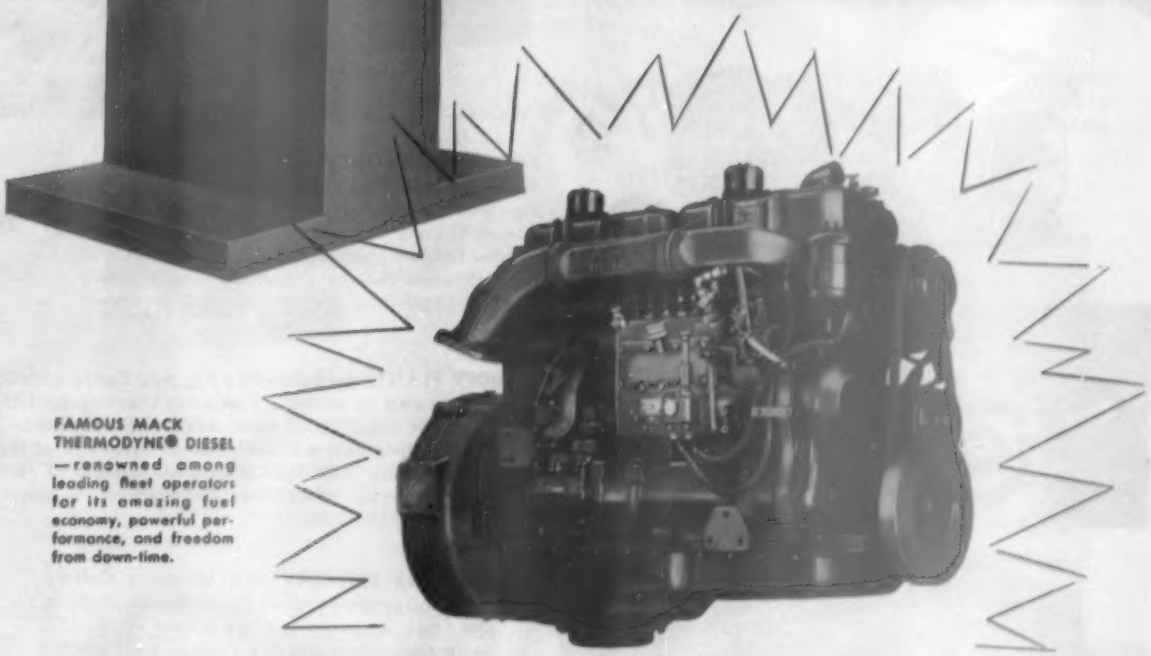
Industry looks to **CHAIN BELT COMPANY**

REX®

Drive and Conveyor Chains • Bulk Handling Conveyors • Construction Machinery
Water and Waste Treatment Equipment • Self Aligning Roller Bearings

STILL 1st ... IN DIESEL TRUCK SALES

MACK



FAMOUS MACK THERMODYNE® DIESEL —renowned among leading fleet operators for its amazing fuel economy, powerful performance, and freedom from down-time.

During 1954 operators again bought more Mack diesel-powered trucks than any other make.

What's more—for '54 Mack earned an even larger share of the market—30.74% of all diesel truck sales—every year a greater share than the year before.

The reasons for Mack's increasing diesel sales and continued top-ranking position are not hard to find. Throughout the nation, operators—large and small—hail the unrivalled fuel economy, reliability and efficiency of the Mack Thermodyne Diesel engine.

No other engine introduced in recent years has met with such enthusiastic owner preference. No other engine gives such big savings in more miles per gallon, less down-time and stand-out performance. A worthy inheritor of the famous Thermodyne name, this great diesel has surpassed even the highest expectations of its manufacturer.

Ask any user of the Mack Thermodyne Diesel. His experience explains why, more and more, the swing is to Mack.

MACK TRUCKS Empire State Building, New York 1, N. Y. 3044

PUT Cedarapids IN YOUR FUTURE!!

FOR BIG-PROFIT AGGREGATE PRODUCTION . . .

PORTABLE DOUBLE IMPELLER IMPACT BREAKERS, used for primary reduction, give high tonnage output of cubical aggregate. The high ratio of reduction (40 or 50 to 1), added to simple design and low maintenance, assures big-volume production of low-cost crushed rock and gravel.

***NEW* CONE CRUSHER SECONDARY** combines the great mobility of Cedarapids portable design with the high capacity and low-cost operation of Symons® Cone Crushers. The result is big-volume finished crushing of even the hardest or most abrasive rock or gravel to uniform, finely crushed aggregate.

SYMONS . . . a registered Nordberg Trademark

COMMANDER PLANT, now built with a big, new Cedarapids 30"x25" Roll Crusher to step up secondary crushing capacity by 12%, turns out *even greater* tonnages of finer-sized aggregate than before . . . *and at the same cost per ton!* The design ratio of the 1036 Jaw Crusher, the new 3025 Roll Crusher, the big 48"x10' Horizontal Vibrating Screen, and the 30" wide Conveyors is the secret of the Commander's high capacity.

PORTABLE PRIMARY with Vibrating Grizzly, which by-passes most of the undersize material and fines, increases primary output up to 25%, and greatly decreases jaw crusher wear per ton of production. Vibrating Grizzlies step up production in any pit or quarry, but are particularly effective wherever the percentage of fines is high.

GET COMPLETE DETAILS FROM YOUR CEDARAPIDS DISTRIBUTOR

The Cedarapids Line of Equipment Includes:

PORTABLE AND STATIONARY CRUSHING, SCREENING AND WASHING PLANTS FOR STONE, GRAVEL AND SAND • BELT CONVEYORS • VIBRATOR AND REVOLVING SCREENS • FEEDERS • HAMMERMILLS • DOUBLE IMPELLER IMPACT BREAKERS • BATCH TYPE AND CONTINUOUS FLOW TYPE BITUMINOUS MIXING PLANTS • DRIERS • DUST COLLECTORS • VIBRATING SOIL COMPACTION UNITS • MOTORIZED HEAD PULLEYS

Built by Iowa . . . Sold the World Over

Assure your share of the coming highway boom!

In the Cedarapids line of aggregate producing and bituminous mixing plants, *there's a type and size of equipment to meet every specification requirement, every operating condition* for the big job ahead of the Highway Construction Industry.

With Cedarapids in your future, you can combine high production with low operating costs for out-sized profits on your share of future contracts!

FOR EVERY BITUMINOUS MIXING JOB

MODEL G60 6000-LB. PLANT is the answer to meeting today's big market demands for asphaltic concrete. The Model G60 produces 3 or more tons at a batch . . . with fully automatic controls, it turns out 180 tons, or more, per hour! Built-in running gear on each sectionalized unit makes transportation easy. Simple, self-contained erection device assures quick set-up.

MODEL G40 4000-LB. PLANT is a new Cedarapids plant designed with every "plus" detail of the bigger G60. Write for a full description of every money-making feature of both sizes.

***NEW* MODEL H15,** a batch-type plant designed for medium sized bituminous paving jobs with capacities ranging from 35 to 60 tons per hour, depending on job specification requirements. This stack-up, tower-type plant is simple to erect, as each section is a self-contained unit.

MODEL CM "COMMERCIAL" MIXER is a money-maker that can't be beat for profitable commercial jobs such as surfacing city streets, driveways, parking lots, playgrounds, tennis courts, etc. This continuous-flow type plant can be used alone to produce cold mix, or with a Cedarapids Drier and Gradation Control Unit for hot mix or high type asphaltic concrete. For bigger jobs, the Cedarapids Master Plant is available.

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U. S. A.

Gentlemen: My next job is_____

☐ Please send details of the Cedarapids equipment you recommend.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

29 YEAR OLD PLYMOUTH PERFORMS WITH

"Rock Bottom" Economy

FOR AMERICAN SILICA SAND COMPANY

Twenty-nine years ago this 12-ton Plymouth went to work for American Silica Sand Co., Ottawa, Illinois. Company officials are pleased with its record of dependable, low-cost performance hauling rock from quarry face to crusher.

"Even though our Plymouth is 29 years old, it still gives excellent service with a minimum of repair costs and negligible down time. We are looking forward to the same kind of "rock-bottom" economy from our other two Plymouths."

A long, trouble-free service life is just one reason for Plymouth's economical operation. Get the whole story on the lower fuel costs, greater efficiency, and increased power of a Plymouth locomotive to fit your hauling, switching, or spotting needs. Models from 3 to 70 tons. Gasoline or Diesel, mechanical or Torqomotive Drive.* Also Diesel-Electrics.

Write today for free catalog from PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-5, Plymouth, Ohio.

PLYMOUTH® TORQOMOTIVES

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

Free-Flowing DU PONT PELLETOL Gives Extra Energy at Bottom of Wet or Dry Holes

Do you have a tough blasting problem—rock that is hard to break—an extra-heavy toe—bottom that is usually hard to pull? Your blasting can be made more effective, and safer, by adding Du Pont Pelletol to "Nitramon"® charges.

This blasting agent, which is extremely free-flowing, was designed to supplement the strength of the basic charge by filling the annular space around the column. It places the maximum amount of energy in the bottom of the hole, where it will do the most good.

Pelletol No. 1 has unlimited water resistance. Its high density causes it to sink rapidly in water—right to the bottom, where it's needed most. Pelletol No. 2 is used when conditions are dry. Either variety of Pelletol poured around a charge of Du Pont "Nitramon" makes efficient use of the total space in the hole.

For maximum blasting power on wet or dry holes plus special safety advantages—low sensitivity, positively no headaches—let Pelletol do the job. Ask for complete information from the Du Pont representative in your area or write: E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT
BLASTING AGENTS
Products of Du Pont Research

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Best bet for better bids–

SPECIFY
GENERAL MOTORS DIESEL POWER

in all your construction equipment

You can *specify* General Motors Diesel power in over 750 different models of equipment built by over 150 manufacturers.

When you do you'll get fast-acting, quick-accelerating 2-cycle Diesel power that will help you do more work, faster, at less cost.

More work, because a General Motors Diesel is a "high torque" engine. And torque—as much as developed horsepower—measures an engine's working ability.

Faster work, because a GM 2-cycle Diesel, with its responsive governor, efficient fuel injectors and power at every piston downstroke, gives you instant pickup in response to changing loads.

Less cost, because a General Motors Diesel burns fewer gallons of safer, cheaper fuel. Also a GM Diesel costs less to buy and the parts cost less than for other Diesels of comparable ratings.

No matter where your contracts take you, you'll find GM Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts. Check your local distributor today for full details on dependable, low-cost Diesel power for your equipment, or write direct for more information.

PURCHASED 23 GM DIESELS SINCE 1947

This LeTourneau-Westinghouse Tournapull is part of an earth-moving fleet used by the Lone Star Steel Company of Lone Star, Texas. The Company, one of the largest producers of steel in the Southwest, has been a consistent user of General Motors 2-cycle Diesel engines in several different kinds of earth-moving, construction and mining equipment for better than seven years.

GM
GENERAL MOTORS
DIESEL POWER

SAVING $170.00 A MONTH IN FUEL ALONE

United Construction Company cut fuel costs over 60% and reduced maintenance costs when they *switched* from gasoline to GM Diesel power on their Moretrench pumps. The GM Diesels worked 24 hours a day, 7 days a week—eliminated stops formerly required to pull and service spark plugs every three days and to replace them every three weeks.

13,000 HOURS—NO REPAIRS

General Contractor A. H. Famularo bought this GM Diesel-powered Northwest 25 Crane in April 1947. In 13,000 hours he never had an injector out, never touched the head or pan. He burns 16 gallons of low-cost Diesel fuel in 8 hours—specified GM Diesel power "because it was economical . . . and has proved to be reliable."

25% MORE WORK; FUEL COSTS ⅓ LESS

Killough Construction Company has *standardized* on GM Diesel power for their portable rock crushing plant in Kansas. The firm uses six GM Diesels to run a hammer mill, operate conveyors and screens, a primary crusher and two shovels. One shovel, converted from gasoline to GM Diesel power, now does 25% more work on one-third less fuel cost.

"WONDERFUL PERFORMER"

This GM Diesel-powered scraper hauled nine yards every four minutes on a recent job for the R. J. Boe Construction Company. Contractor Russell Boe likes the "wonderful acceleration and trouble-free performance GM Diesel power gives me." He says, "All you need to do is keep water, oil and clean fuel in that GM Diesel and you'll get a good day's work out of it."

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

Here's Rope that takes the toughest service!

MONARCH WHYTE STRAND Wire Rope by MACWHYTE

This top quality Rope is available in all classifications—in the size and construction that will serve best on your equipment. MONARCH WHYTE STRAND is highest strength Wire Rope, made of Improved Plow Steel.

To meet the needs of all equipment and the toughest of service conditions, there are a thousand and one types, sizes, and grades of MONARCH WHYTE STRAND Rope. Each of the Wire Ropes in this selection is designed to fill an equipment need and to assure longer, safer service at lower operating cost.

These Ropes are available Internally Lubricated, PREformed, Lang Lay or Regular Lay, Fiber Core, or Independent Wire Rope Core. Wire combinations vary from 42 wires in 6 x 7 construction to 343 wires in 6 x 49 IWRC construction.

Put MONARCH WHYTE STRAND Wire Rope on your equipment. Enjoy the advantages of having the rope that will take the toughest service.

MACWHYTE

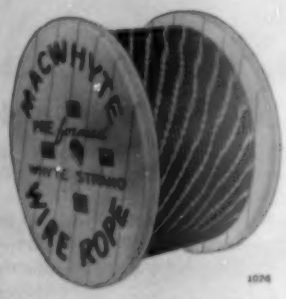
WIRE ROPE · SLINGS · WIRE ROPE ASSEMBLIES

Macwhyte Company · 7949 Fourteenth Avenue · Kenosha, Wisconsin

Manufacturers of Internally Lubricated, PREformed Wire Rope; Braided Wire Rope Slings; Aircraft Cable and Accessories; Special Alloy, Stainless Steel Wire Rope; and Wire Rope Assemblies

DISTRIBUTOR DEPOTS

New York 4, 19 Water Street
Pittsburgh 19, 204 Ballard Avenue
Chicago 6, 230 So. Canalport Street
St. Paul 14, 2326 Hampden Avenue
Portland 9, 5801 N.W. 14th Avenue
Seattle 4, 67 Holgate Street
San Francisco 7, 141 King Street
Los Angeles 21, 2015 Sacramento Street



Ask for
MONARCH WHYTE STRAND
Bulletin 5425.

For the proper Wire Rope size and construction for your equipment, request a Macwhyte recommendation.

EDITOR'S PAGE

Personal Contacts and Soil Tests Will Combine to Sell Agstone

MUCH HAS BEEN MADE OF THE DECLINE in total farm income in the last few years, and the drop is blamed for the marked reduction in sales of agricultural limestone. The facts do not seem to indicate that this economic factor is a substantial cause for the decline in sales.

It must be recognized that farms have been growing in size and the rural population has been shrinking. Total farm income is thus divided among fewer farmers, which has bearing on the individual farmer's income. Size of farms has increased by one-quarter over the past fifteen years and farm population has decreased even more.

Over the same period of years farm production has gained a third for the same number of acres. This has been due to technological developments in farm equipment and the use of improved seeds and fertilizers.

Thus, it is indicated that the farmer has become more substantial and is a higher class prospect as a potential customer than he used to be. There are exceptions, of course, like in any field, and there is the marginal farmer to consider, who will always be difficult to sell anything.

Tonnage of agricultural limestone spread has dropped from a peak of thirty million tons in 1947 to less than 20 million tons this past year. The mandatory soil test and all manner of red tape in administration of the soil conservation program undoubtedly have contributed to the decline.

However, the excuse that farmers are short of funds seems to have little merit. They do have the money to buy commercial fertilizers, new automobiles, television sets, deep freezers and many luxuries that cost lots more than agricultural limestone. It's a question of prying a small part of available funds loose to pay for a commodity that is cheaper than anything else that the farmer buys, and one that will pay rich profits to him. The need is for eighty million tons annually to maintain soil fertility.

Record-breaking purchases of high-priced fertilizer, all out of proportion to the much higher amount of agricultural limestone needed for sustaining fertility and best utilization of such fertilizers, indicate failure to get the liming story across. Certainly, poor appreciation of the value of liming on the part of farmers is indicated, and inefficient teaching is to blame in view of the wealth of scientific data available to prove the benefits from liming.

The farmer is a businessman and he is interested in profits. He has become much more that way in the last decade and will become more interested in ways to combat cost-price pressures. Demands to come from our growing population will tax his capacity to produce from his limited acreage which, it seems, can be turned to advantage by the limestone industry.

In efforts to improve efficiency, the farmer will have to — and he will want to — know more about what nutrients to use and optimum amounts of each. His fertilizers have given quick returns but he certainly would want to increase results from them if he can positively be shown that agricultural limestone will do that job.

He must be taught to expect slower but nevertheless profitable results from liming and he must be made to realize that limestone isn't only an acid-corrective but a source of essential calcium, magnesium and other soil minerals. Farmers who are satisfied with increasing yields through use of fertilizers on acidic soils must have it demonstrated that liming will greatly increase yields. The practice of under-liming and attendant inferior results must not be permitted to undermine the cause of liming. Over-liming is to be discouraged and greater stress be made on quality of product, and delivery and spreading service.

If information from the vast amount of available research be properly presented in an educational program that proves a profit return many times over the cost of liming, the better farmer will buy even though his income may be down. He must use agricultural limestone for greatest profits and no other incentive should be needed.

The agricultural limestone industry, broadly speaking, has not had enough esteem for its own product and the majority of producers have been content to bid low prices on government contracts to the total neglect of the main market. They have not tied their activities to the real benefits for the farmer, and they have depended too much on the government and others.

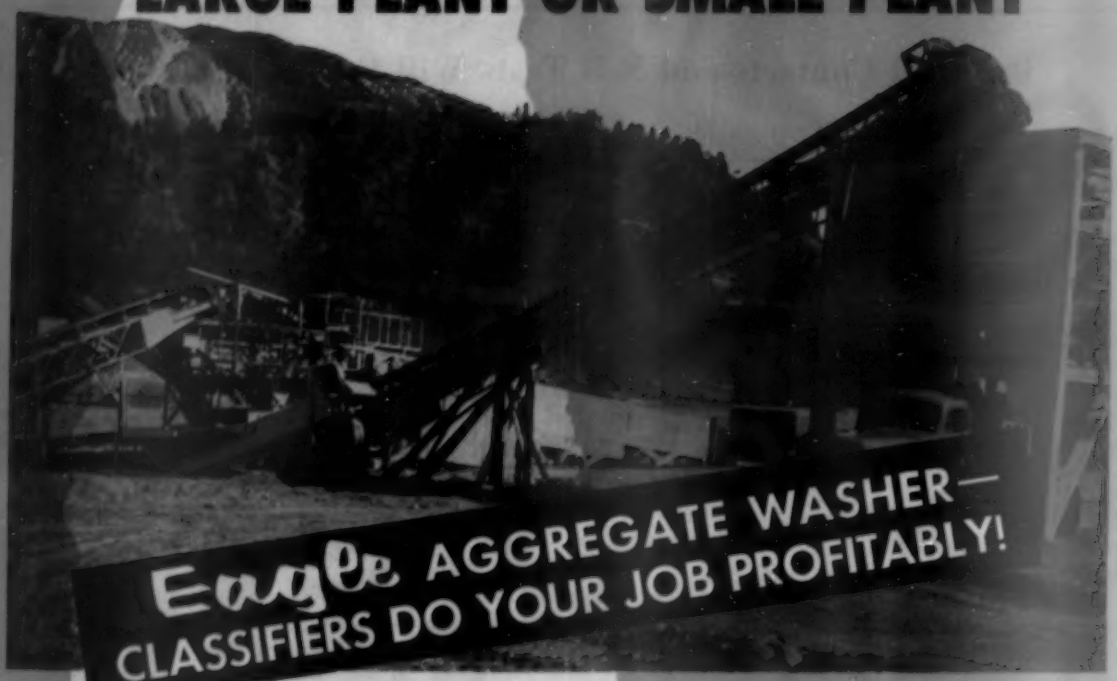
We have far too many producers who are no more than truckers depending on the government to underwrite their business. As a result, prices are too low to finance adequate merchandising and a good bargain has gone begging.

Fortunately, there is now evidence of a growing appreciation of the need for salesmanship and sales promotion, on the part of the better producers. These producers stand out because their sales are not following the downward trend.

The value of salesmen and agronomist contacts is being clearly established, and the requirement for more soil testing, if properly interpreted and applied, should give them much to bolster their story and reverse the downtrend.

Bror Nordberg

LARGE PLANT OR SMALL PLANT



Eagle AGGREGATE WASHER—CLASSIFIERS DO YOUR JOB PROFITABLY!

Whatever the size of your plant—whatever your capacity requirements—regardless of location—Eagle Washing-Classifying-Dehydrating Equipment can make money for you.

Eagle units wash material clean, classify material giving you all of the blends of meshes that you require, and quickly return their initial cost.

Eagle has the broadest line of washing equipment—for fine materials, coarse materials, gravel, crushed rock, ore. Design is based upon many years' experience in the field and the greatest number of profitable installations.

Plant of Emil Anderson Construction Co., is shown, at Lillooett, British Columbia. A 24" dia. x 22' single screw fine material unit in conjunction with a portable gravel crushing and screening plant is processing aggregate for the concrete lining of a 2½ mile long flume to bring water to a hydro-electric plant.

Get the facts in *NEW* 44-page Eagle Catalog 55.

POWER-OPERATED VALVES INCREASE EFFICIENCY OF EAGLE WATER SCALPING-CLASSIFYING TANKS.

Assures precision removal of excess water, prevents excessive bleeding of water through valves, eliminates build-up of sand at any one valve. Provides uniform, continuous flow of correct sand-water ratio. Improves classification.

It's "GOOD RIDDANCE" To Aggregate Washing-Classifying Worries When You Call In Your Factory-Trained EAGLE EQUIPMENT DISTRIBUTOR.

He will show you how to get your washing-classifying job done with minimum investment. He will see that you get satisfaction and service — backed by the entire Eagle organization. He will give you the benefit of our vast experience and field study. Let us put you in touch with him.

EAGLE IRON WORKS

137 HOLCOMB AVE., DES MOINES, IOWA

EAGLE IRON WORKS

EXPERIENCE-PROGRESS-SERVICE SINCE 1872

Log Washers

"Spintech" Dredge Ladders

Breaker Bells and Pile Hammers

Revised "Chemistry of Portland Cement"

ROCKY'S NOTES

NATHAN C. ROCKWOOD

IT ISN'T OFTEN, in revising a book published only seven years, that the author has the opportunity to completely rewrite it, if he so elects. Apparently Dr. Robert H. Bogue had that opportunity in revising his "The Chemistry of Portland Cement," second edition, recently received.* This new edition of the book, which appeared originally in 1947, has been entirely reset in larger and more readable type, which with additions of results of recent research, makes a book of 793 pages, compared with 569 pages in the earlier edition.

In his introduction to this new edition, Dr. Bogue writes: "During the last few years advances have been quickening in the field of cement chemistry which appear to be of such importance as to mark the introduction of a new era in the scientific approach to the problems of the cement industry. The fields of new exploration are concerned in a large measure with the ultimate molecular and crystallographic structure of the phases that constitute cement and its hydration products. The importance of these structures, determined by X-ray, electron optical, spectroscopical, and thermo-analytical methods, is explained by the character of information that can be gleaned from their solution. With that information, the cement manufacturer will be given a new means of control in the production and quality of his product, designed to meet the advancing needs of the building industry, and the building engineer a new means for control in the formulation and utility of his concrete, designed to meet any combination of commercial requirements."

From several days' examination of the text, and comparisons with the first edition, this reviewer can't escape the conclusion that we are still a long way from having determined "the ultimate molecular and crystallographic structure of the phases that constitute cement and its hydration products," in such a way, or at least in language, that can be put to much practical application in the manufacture and use of portland cement. Unquestionably there is a great stock of useful and practical information in the book, but only the most careful and diligent reader will be able to marshal it. The same criticism often applied to the first edition, that it was primarily a treatise on portland cement research rather than a text-book for practicing chemists in the cement industry, can we fear be applied to the new edition as well. Nevertheless, there is evidence that the author has made much progress in presenting his subject in less highly technical terms.

*Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N.Y.; price $16.50

Research Reference Book

Dr. Bogue's book is undoubtedly the best compendium and digest of research on portland cement and its constituents, at least in the English language. This character has not changed since the first edition, and the chapter headings in most instances are the same. As a layman who has read and studied the various sciences involved in this kind of research for at least the last seven years, this reviewer is much better able to understand most of the text, than he was of the first edition. It is to be hoped that working chemists in the cement industry and others interested have made at least equal progress. However, we believe that there are large sections of the book, which still are of little interest to anyone except those who wish to refer to results obtained by certain historic researchers on specified subjects. Such results were often contradictory, so the reader inexperienced in similar research work is hardly able to draw inspiration or conclusions of current value. Perhaps this difficulty is inherent in any text on a subject which all agree is so full of complications, but a critical summary at the end of each chapter would have been very helpful.

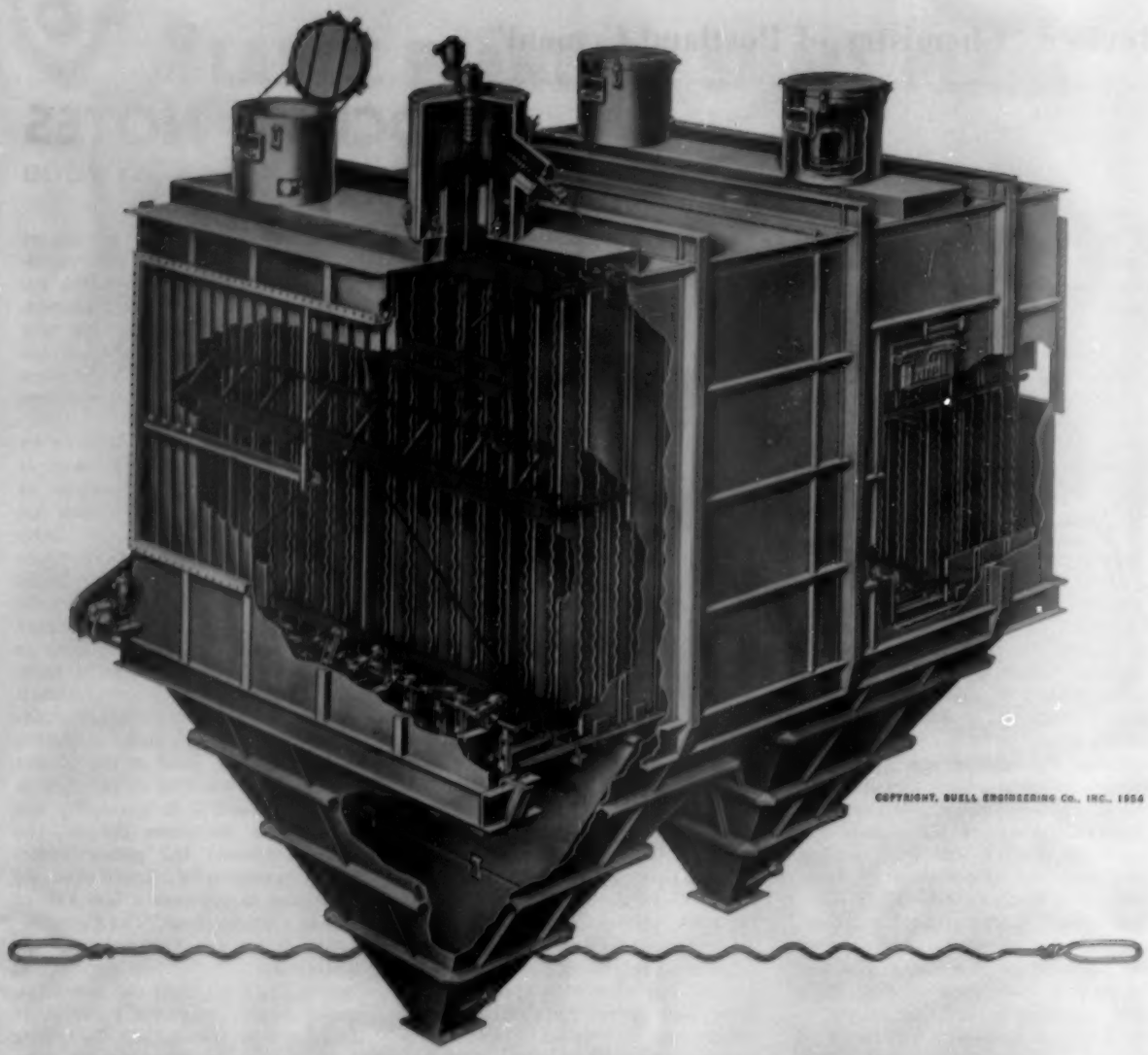
Role of Magnesia

As an example of what we mean, suppose the reader is interested in the effect of magnesia in cements, as many now are since a specification is under consideration for portland-slag cement. Should the chemical limit for the magnesia content be set regardless of the source or character of the magnesia? The first reference we find (and it is not in the index) is in Chapter 2 on the "Manufacture of Portland Cement." It says: "Blast-furnace slag produced from high grade ores, not too high in magnesia, may be used satisfactorily as the source of alumina and silica." There is no suggestion as to what "not too high" means, except later on where it is stated that "standard" specifications [evidently for cement] limit the magnesia to 5 percent. There is no discussion of the very practical point as to whether or not magnesia in slags results in the same product (periclase) in cements as does magnesia in limestones.

The next reference to magnesia we find is in Chapter 5 on "Methods of Investigation" where the methods of determination of MgO in clinker are described (also *not* indexed under "magnesia"). The first index reference to MgO is in Chapter 6 in "Heat Treatment in Manufacture," where the effect of MgO content (as periclase) in the cooling of clinker is held to result in delayed expansion of hardened concrete (or cement paste). Chapter 7 on "Principal Constituents of Clinker" describes how the MgO is dissolved in the glass of the clinker as very small particles of periclase in which condition it is apparently less harmful. In the same chapter (no index reference) the author quotes Jeffery in explaining a function of Mg in helping to organize a unit cell of C_2S. In Chapter 8 on "The Combination of Cement Components," the author says: "° ° ° we may expect that as Fe_2O_3 or MgO (no index reference under "magnesia") are introduced into the system CaO-Al_2O_3-SiO_2, in the range of portland cement, there will result on burning (a) a fluxing action due to liquid formation, which will accelerate the reactions, and (b) a change in the relative amounts of the compounds formed, that may accelerate or may retard the reactions."

The Chapter 9 on "Design and Control of Cement Composition" contains a reference to the experiments of the Newberrys (some 70 years ago) in replacing CaO with MgO in mixtures of pure silica and alumina (no reference to this in the index under "magnesia"). From the experiments, according to our author, these mixtures calcined [presumably at portland cement clinker temperatures] were devoid of hydraulic properties. From other sources of data it seems to this reviewer that such an experiment could well be repeated, but with calcination at much lower temperatures and for longer periods. This appears to have been the reason for the hy-

(Continued on page 176)



World's Most Effective Dust Collector

From Pennsylvania to Peru . . . the Buell 'SF' Electric Precipitator is establishing new records for dust recovery.

Whether your interest is efficiency . . . low maintenance costs . . . greater dependability . . . you'll find them all demonstrated in the *daily* operating records kept by our customers. We invite you to inspect them from *any* angle.

We'll be glad to give you the name of one near you, so you can *see for yourself* how Buell 'SF' Electric Precipitators recover as much as 40 tons daily . . . how they often provide a handsome *cash* return.

Take a good long look at such exclusive features as the Buell 'Spiralectrode' which is unequalled for effective dust precipitation.

Write today for your complimentary copy of our Brochure which describes *all three* Buell Systems—The Collection and Recovery of Industrial Dust. Write Dept. 17-D, Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

buell®

MECHANICAL ELECTRICAL

20 Years of Engineered Efficiency in

DUST COLLECTION SYSTEMS

LABOR RELATIONS TRENDS

By NATHAN C. ROCKWOOD

Decision on Fine Point of Management Rights

THERE IS A TREND toward changes in state workmen's compensation laws to include any and all afflictions that may conceivably be caused or aggravated by one's employment. This introduces a new angle in labor union contracts, if the employer would protect himself against being compelled to put employes in positions which may prove costly to the employer in compensation payments or insurance rates. The point we have in mind can be best illustrated by a recent case decided by an arbitrator (Maurice S. Trotta) appointed by the New Jersey State Board of Mediation. The issue involved an employe of the National Gypsum Co. at its Garwood, N. J., rock wool plant. What follows are largely extracts from the arbitrator's decision, with our own abbreviations in some instances, in order to shorten the text.

Background

"On March 18, 1953, the plant closed down because of a strike and did not open until March 29, 1954. Sometime during this period, an employe filed a compensation claim for a skin irritation. This skin irritation was allegedly caused by rock wool-fibers. The company uses rock wool in the manufacture of a product for insulation purposes. In February, 1954, the employe was sent by the company to a dermatologist, who examined the employe and sent a report to the company. On October 7, 1954, the employe was again examined and a supplementary report sent to the company.

In May, 1954, a dispute arose between the company and the union concerning the duties of a Stock Clerk, a job then held by the employe. This dispute was settled and it was agreed that he could either retain his job of Stock Clerk, or exercise his seniority and select another job. The employe selected the job of Tube Stitcher, which paid about 90¢ more an hour. The company refused to assign him to this job and set forth its reasons in a letter dated July 6, 1954, which reads in part as follows:

" 'In regard to the issue, we believe our present position is correct. It is our opinion that each recurrence of an allergy is compensable under the Workmen's Compensation and such recurrence would subject this employe to the possibility of more serious ailments. We feel therefore, that the provisions of the contract specifying that an employe must be reasonably qualified to do the work also include this particular qualification. There is a further article in the contract which requires that the company do everything necessary to provide for, promote and insure the safety, health and welfare of its employes. It is our opinion that we would certainly be derelict under this clause if we permitted him to continue to expose himself.' "

"In September, 1954, the Tube Stitchers job again became vacant and was posted for bidding. The employe in question bid for the job but was again refused on the grounds of his allergy to rock wool.

"The union thereupon filed a grievance dated September 9, 1954, which read as follows:

" 'Violation of Article 11, Paragraph 6, of Working Agreement. Company refused to give Bag Stitcher's job vacancy to this employe. This man has performed this job for years, yet the company sees fit to disqualify him.'

"Article 11, Paragraph 6, reads in part as follows:

" 'The company shall immediately post all job vacancies for two full days and employes who desire said jobs may affix their name to said posted job. The employe having the longest seniority shall have first preference to the job providing he is reasonably qualified to do the work or adjust himself to the job.' "

Company's Argument

"The company alleges that it was justified in refusing to assign this employe to the job of Tube Stitcher.

"It was pointed out that he has an allergy that causes a skin irritation when he is exposed to rock wool. This fact was established, according to the company by a dermatologist, who performed patch tests.

"The company further alleges that the employe is now suffering from an irritation for which he is seeking compensation, and that if he is assigned to the tube stitching job it will increase his exposure to rock wool fiber and his condition will be aggravated.

"The company points out that it was advised by the dermatologist that in order for the irritation to be eliminated it is necessary to avoid exposure to the rock wool.

"The job of Stock Clerk which the employe holds does not require him to be constantly in the plant where the rock wool is present, whereas the Tube Stitching job would obligate him to work in the immediate vicinity of the machine that produces the batts of rock wool.

"The company argues that it has a responsibility for the health, safety and welfare of employes and for this reason it did not assign the employe to a job which would aggravate his condition. It is also argued that management has a responsibility in regard to the costs of operation and should not incur known risks which would increase costs of operation.

"According to the company, the action taken in regard to this employe is justified under Article 11, paragraph 6, Article 15 and Article 16, paragraph 8.

"Article 11, paragraph 6, states in part: 'The employe having the longest seniority shall have first preference to the job, provided he is reasonably qualified to do the work or adjust himself to the job.' The company alleges that this particular employe, because of his allergy is not qualified to perform the duties of tube stitcher.

"Article 15 of the contract is the 'Management Clause' and under it management has the right to manage plant and direct the working force.

"Article 16, paragraph 8, reads as follows:

" 'In the event of a machine stoppage, the machine crew may be assigned to clean up work around the entire machine. If the breakdown can be expected to last more than thirty (30) minutes, the machine crew may be assigned to more extensive cleanup work, or any work in the warehouse loading operations. When such assignments are necessary reasonable consideration will be given to the following factors as they affect the employe.

(a) Nature of the work
(b) Working conditions
(c) Ability of the employe
(d) Physical condition of the employe.

" 'The company agrees that these work assignments will be on a rotating basis.' "

"It was pointed out by the company that under subdivision (d) it must take into consideration the physical condition of the employe.

"The company concludes that under

(Continued on page 178)

INCREASED

REFRACTORIES SERVICE FOR THE CEMENT INDUSTRY

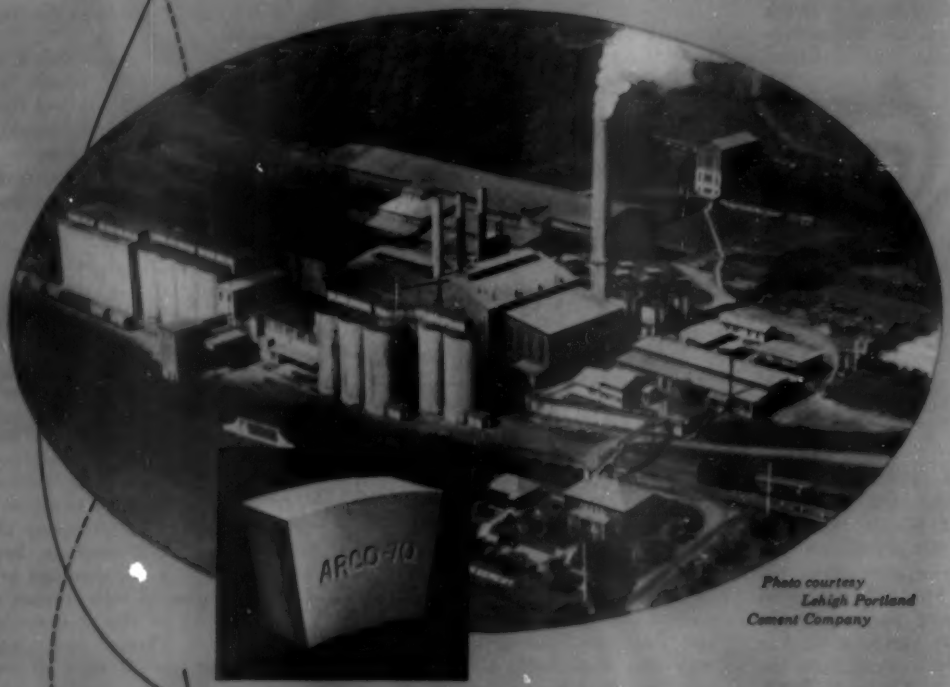


Photo courtesy Lehigh Portland Cement Company

We can now supply Grefco's superior quality high alumina brick from our works at Orviston, Pennsylvania, as well as from Danville, Illinois. These include Grefco's well-known ARCO-70, ARCO, and SEMALU (50% alumina).

We know the extraordinary demands being made on the cement industry, and hope that this action on our part will help the industry meet its urgent schedules.

GENERAL REFRACTORIES COMPANY
Philadelphia 2, Pa.

A Complete Refractories Service

GENERAL REFRACTORIES COMPANY

PEOPLE

IN THE NEWS

John Best Retires

JOHN C. BEST has retired as vice-president of National Gypsum Co., Buffalo, N. Y. Former president of Best Bros. Keene's Cement Co., which was founded by his father, Mr. Best joined the industrial division of National Gypsum Co. in 1938 when it purchased the Best Bros. Keene's Cement Co. plant and gypsum deposits at Medicine Lodge, Kan. Mr. Best was born in Yorkshire, England, where his father and grandfather were in the gypsum business. He was educated in England and came to this country as a young man to take care of the family's American holdings, subsequently becoming an American citizen and serving as a 1st lieutenant in World War I. Since 1941, Mr. Best has traveled widely throughout North America and has purchased 20 plants for National Gypsum Co. From 1935 to 1946 he served as president of the Gypsum Association, Chicago, Ill., and during World War II he represented the industry on several government boards. Mr. Best is also a vice-president of the A. M. Meincke Co. and the National Gypsum (Canada) Ltd.

John C. Best

Technical Service Director

CLAYTON L. DAVIS has been appointed technical service director of Universal Atlas Cement Co., New York, N. Y., to succeed Earl R. Bryant who died January 26. He was formerly engineer of tests. A native of Alabaster, Mich., Mr. Davis is a civil engineering graduate of the University of Michigan, Ann Arbor, Mich. He joined Universal Atlas in 1930 as engineer in the inspection bureau. In 1937, he became assistant engineer of tests, and two years later moved to the New York office, where he was appointed engineer of tests in 1943. Prior to joining Universal Atlas, Mr. Davis had several years of experience in the physical testing of cement for Huron Portland Cement Co. and the Michigan State Highway Laboratories.

Mr. Davis has long been active in the American Society for Testing Materials. He is a member of Committee C-1 on Cement and of Committee C-9 on Cement and Concrete Aggregates, and is serving on many subcommittees. He is also a member of the American Concrete Institute and is currently serving on its subcommittee 613, Recommended Practice for Proportioning Concrete Mixes.

Clayton L. Davis

George Rackle Heads Firm

GEORGE P. RACKLE has been elected president of The Geo. Rackle Sons Co., Cleveland, Ohio, and Houston, Texas. Formerly general manager of the Texas division, he succeeds his father, George L. Rackle, who has been named chairman of the board. A graduate of Culver Military Academy and of Case Institute of Technology, Cleveland, Ohio, Mr. Rackle served as an officer in the civil engineering corps of the National Coast Guard during World War II. He is a member of the American Concrete Institute and the American Society of Civil Engineers.

George P. Rackle

Universal Appointments

PHILIP N. BUSHNELL, formerly assistant manager of industrial relations, has been appointed director of labor relations of Universal Atlas Cement Co., New York, N. Y. James F. Collins, supervisor of personnel and training, has been named director of personnel and training, and William A. Kipp, supervisor of safety, has been made director of safety.

Mr. Bushnell, a native of LaGrange, Ill., attended Beloit College, Beloit, Wis., and entered industrial relations work as assistant to the managing director of the National Safety Council, Chicago, Ill., in 1927, and became safety engineer with the Portland Cement Association in Chicago in 1933. Four years later he was appointed industrial relations director of the Missouri Portland Cement Co., St. Louis, Mo., where he served until joining Universal Atlas in 1943 as assistant manager of industrial relations. He is a member of the Industrial Relations Research Association and past chairman and member of the executive com-

mittee of the Cement and Quarry Section of the National Safety Council.

Mr. Collins joined Universal Atlas in 1946 as supervisor of personnel and training. A native of New York City, he received a B.S. degree from Fordham University in 1935, an M.A. degree from New York University in 1936 and a Ph.D. degree from Fordham in 1941. He was on the teaching staff of Fordham University until World War II. He served in the U. S. Navy as assistant batallion officer at USN Midshipmen's School, Columbia University, before joining the staff of the Secretary of the Navy. He is a member of the New York Personnel Management Association and the American Society of Training Directors.

Mr. Kipp is a native of Birmingham, Ala., and a graduate of Birmingham Southern College. He first joined Universal Atlas in 1924 as secretary to the plant manager at Leeds, Ala., and in 1937 was appointed safety director. He left the company in 1941 to engage in security work for the Army Ordnance Department and in 1943 was attached to the Security Branch of Army Intelligence as chief of the safety division in the Third Army Area. He rejoined Universal Atlas in 1947 at New York as staff assistant in the industrial relations department, and was appointed supervisor of safety in 1948. He is a member of the American Society of Safety Engineers, Cement and Quarry Section of the National Safety Council, and the Safety Advisory Committee of U. S. Steel Corp.

P.C.A. District Engineers

HAROLD G. GARNER has been appointed district engineer of the Kansas City, Mo., office of the Portland Cement Association, Chicago, Ill. He succeeds Edward J. Mueller, who has retired. Mr. Garner was formerly district engineer of the Omaha, Neb., office and will be succeeded by Kenneth B. Lucas, who has been special paving engineer since July, 1954.

Harold G. Garner

Kenneth B. Lucas

Mr. Garner, a graduate of the University of Missouri, Columbia, Mo., was a division soils engineer for the Missouri State Highway Department before joining the Portland Cement Association in 1940 as a soil-cement engineer in the Omaha office. In 1943 he was transferred to the Washington, D. C., office as paving engineer; in 1946 he went to Topeka, Kan., in the same capacity, and in 1949 he was named district engineer of the Omaha office.

Mr. Lucas is a graduate in civil engineering of Kansas State College of Agriculture and Applied Science, Manhattan, Kan. Prior to joining the Portland Cement Association he served with the State Highway Commission of Kansas and as an officer with the United States Navy. He joined the P.C.A. in 1947 as a field engineer in the Omaha district office, serving until July, 1954, when he was appointed special paving engineer.

Heads Limestone Division

CHRISTIAN F. BEUKEMA has been named president of the Michigan Limestone Division of U. S. Steel Corp., New York, N. Y. He was formerly vice-president and succeeds Hugh S. Lewis who continues in a consulting capacity. Born in Grand Haven, Mich., Mr. Beukema joined Michigan Limestone at Rogers City, Mich., in 1940, after graduating from Michigan State College, East Lansing, Mich., with a degree in civil engineering. After four years of Army service, he rejoined the division as construction engineer. In 1949, he was transferred to U. S. Steel as special assistant to the vice-president of raw materials and in 1951 was named director of planning on long range iron ore development. He returned to the Michigan limestone division in 1953 as manager of operations and was made vice-president in 1954.

Appointed Vice-President

FRANK M. CASHIN, manager of the chemicals division, has been appointed a vice-president of Kaiser Aluminum & Chemical Corp., Oakland, Calif. He has been associated with the chemicals division for the past 12 years, opening the company's first eastern sales office in 1944, in Akron, Ohio. In 1952 he was transferred to Oakland and a year later was named manager of the division, which now is a major producer of calcined dolomite with a dolomite quarry and plant at Natividad, Calif. Mr. Cashin attended Columbia University, New York, N. Y., majoring in business administration.

Frank M. Cashin

Joins Engineering Firm

T. B. COUNSELMAN, formerly manager of the fluosolids sales division of The Dorr Co., Stamford, Conn., has joined Behre Dolbear & Co. of New York, mineral consultants in mining, geology, metallurgy and management. A graduate of Columbia University, New York, N. Y., as engineer of mines, Mr. Counselman has long been active in the American Institute of Mining and Metallurgical Engineers. He has served as chairman of the Chicago and New York sections, as vice-chairman of the Iron and Steel Division, and as chairman of the Milling

Methods Committee. He was largely instrumental in the formation of the Institute's present Minerals Beneficiation Division. He is currently a vice-president of A.I.M.E. and a member of the executive committee of the board of directors.

Sales Manager

GEORGE PATTERSON has been named sales manager of the block plant division of Price Bros. Co., Columbus, Ohio. He was formerly on the sales staff of the company.

OBITUARIES

HARRY C. KOCH, retired vice-president in charge of sales of the Lone Star Cement Corp., New York, N. Y., died February 16. He was 78 years old and had been associated with the cement industry for 39 years. Born in Annville, Penn., Mr. Koch joined the Iola Portland Cement Co., Iola, Kan., in 1903, moved to the Dixie Portland Cement Co., Chattanooga, Tenn., in 1907 and to the Mission Portland Cement Co., San Francisco, Calif., in 1917. Two years later Mr. Koch went to Dallas as sales manager of the Texas Portland Cement Co., which became part of the International Cement Corp. when that company, predecessor of Lone Star Cement Corp., was formed in 1919. Mr. Koch was associated with Lone Star for 23 years.

MYRON J. WURTENBERGER, founder, president and treasurer of The Frontier Stone Products Corp., and the Frontier Dolomite Concrete Products Corp., Lockport, N. Y., died recently at the age of 58. Mr. Wurtenberger became associated with the John Irwin Construction Co., Inc., in 1926. A few years later he and E. Kirk Webster formed the Pekin Stone Products, Inc., and the Frontier Bituminous Materials Corp. These two firms were merged into the Frontier Stone Products Corp. in 1945 when Mr. Webster retired and Mr. Wurtenberger became president and treasurer. In 1951, the Frontier Dolomite Concrete Products Corp. was incorporated with Mr. Wurtenberger as president and treasurer. He was also president and treasurer of the John Irwin Construction Co., Inc.

SAMUEL HENRY COWELL, president of the Henry Cowell Lime and Cement Co., San Francisco, Calif., died February 1 at the age of 93. He was the son of Henry Cowell, founder of the company and pioneer developer of California resources, who had large lime and cattle holdings and thousands of acres of pasture land and forest. Born in San Rafael and educated in Marin County and eastern schools, Mr. Cowell became president of the firm and head of the Cowell interests after the death of his father. His philanthropies and those of other members of the family total many millions of dollars, the family's wealth stemming from widespread purchases of limestone deposits. Recently, Mr. Cowell turned over to the public as a recreation area a 1600-acre grove of Redwood trees as the Henry Cowell Redwood State Park in memory of his father.

EARL R. BRYANT, technical service director of the Universal Atlas Cement Co., New York, N. Y., died January 26 at the age of 47. Born in King City, Mo., Mr. Bryant was a graduate of the University of Missouri, Columbia, Mo., and during World War II served as a 1st lieutenant in the Corps of Engineers, U. S. Army. After the war he was appointed technical service manager in the Kansas City, Mo., office of Universal Atlas, serving until 1953 when he was transferred to the New York office as technical service director.

ARTHUR G. ANDERSON, retired president of the West Virginia Black Rock Co., Charleston, W. Va., died January 25 in Tallahassee, Fla., while enroute to Orlando, Fla., with his brother, Roy, of Orlando. A native of Chattanooga, Tenn., Mr. Anderson lived for many years in Columbus, Ohio, before moving to Charleston to organize the West Virginia Black Rock Co., which he headed until his retirement two years ago. He continued as a director of the company after his retirement and his son, Paul R. Anderson, succeeded him as president of the firm.

ROBERT BELVILLE DICKINSON, retired managing director of Anglo Alfa Cement, Ltd., Johannesburg, South Africa, died February 26. He was 73 years old and lived in New Canaan, Conn. Mr. Dickinson was born in Chicago, Ill., and held several positions in the cement industry. He was a former vice-president and general manager of Marquette Cement Manufacturing Co., Chicago, and was at one time associated with the Dominion Portland Cement Co. of New Zealand. In 1934 he went to England to become general manager of Anglo Alfa Cement, Ltd., and two years later was named director of the firm. When Mr. Dickinson retired in 1940, he returned to the united States.

L. J. BOXLEY, president and director of the Blue Ridge Stone Corp., Trego Stone Corp., and Pounding Mill Quarry Corp., Roanoke, Va., died in February after a short illness. After graduation from Washington and Lee University, Lexington, Va., Mr. Boxley entered the contracting business in 1909. Five years later, he became a member of the firm of W. W. Boxley & Co. in Roanoke, Va. He had also served as vice-president and director of the Pembroke Limestone Corp., and as regional vice-president and a director of the National Crushed Stone Association, Washington, D. C.

WALTER H. HARRISON, retired president of the Southern Ferro-Concrete Co., Memphis, Tenn., and a pioneer in the South in the use of reinforced concrete, passed away February 4. He was 92 years old. One of the leading engineers of the South, Mr. Harrison was a graduate of the College of Richmond and the University of Virginia, Charlottesville, Va.

JESSE A. SHEARER, president and founder of the Indiana Gravel Co., Indianapolis, Ind., died February 1. He was 81 years of age. A pioneer in the gravel business, Mr. Shearer founded the company in 1904. He previously was owner of the White River Sand and Gravel Co., and also founded the Indiana Equipment Co.

J. MURRAY GALLAGHER, secretary-treasurer of Gallagher Bros. Sand and Gravel Corp., New York, N. Y., died February 7. He was 46 years old. He was also president of the United States Dredging Corp.

GUY A. MILLER, owner of The Beloit Concrete Products, Beloit, Kan., died January 21, but the business will continue under the management of Mrs. Guy A. Miller and son, J. J. Miller, who has been associated with his father.

BENJAMIN J. BASKIN, vice-president of the Concrete Products Co. of America, Philadelphia, Penn., died suddenly in February. A member of the American Concrete Pipe Association, Mr. Baskin was well known for his activities in prestressed bridge designs as well as his work in concrete pipe.

WILLIAM J. THORNTON, owner of the Manchester Sand and Gravel Co., Manchester, Conn., died March 2 after a short illness. He was 63 years old.

JOHN BRANDS, SR., vice-president of the Wapak Sand and Gravel Co., Lima, Ohio, died January 28 following a three-month illness. He was 91 years of age.

RUDOLPH MUHLBERGER, owner and operator of the Concrete Prefab Co., Newton, Ohio, died suddenly on February 10. He was 65 years of age.

ROBERT J. RAWLINGS, owner of Concrete, Inc., Newport, Ky., died February 15 at the age of 61. He had founded the company in 1946.

Making Time on the N.Y. Thruway!

Le Roi 600 cfm compressor and Cleveland T-286 drill rig speed drilling operation

Motorists aren't the only ones who travel fast on the N. Y. Thruway. Contractors had to make plenty of time, too.

That's why this contractor made a mobile drilling unit out of his D-8 Cat. He used as components a Le Roi 600 CTM compressor and the Cleveland T-286 drill rig.

The compressor is designed especially for use with D-8 or TD-24 tractors. It is the only unit that attaches directly to the PTO and has a clutch as well. Capacity of the unit is 600 cfm.

The T-286 drill rig consists of two Cleveland patented air feeds, and Cleveland 4" drifters with air-motor booms. Here, it is mounted on the front of the tractor and has a spread of 220 degrees suitable for any variable drill pattern. Ten-foot steel changes, faster set-ups, better hole spacing, greater footage, better fragmentation—mean faster drilling and lower costs.

If you want to make time and cut costs on your rock jobs — just put an old tractor to work this way. Write us for literature that tells how.

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS • TRACTAIR • STATIONARY AIR COMPRESSORS • ENGINES • AIR TOOLS • TRUCK MIXERS • FRONT-END LOADERS

C-189

NATION-WIDE SALES-SERVICE NETWORK

ALABAMA: Birmingham, Mobile — ARIZONA: Phoenix — ARKANSAS: Little Rock — CALIFORNIA: Bakersfield, Long Beach, Los Angeles, San Francisco — COLORADO: Denver, Grand Junction — CONNECTICUT: Hartford — FLORIDA: Jacksonville, Miami, Tampa — GEORGIA: Augusta, Decatur — IDAHO: Boise, Idaho Falls, Twin Falls — ILLINOIS: Chicago — INDIANA: Indianapolis — IOWA: Cedar Rapids, Des Moines, Waterloo — KANSAS: Great Bend, Kansas City, Pratt, Wichita — KENTUCKY: Lexington, Louisville — LOUISIANA: New Orleans, Shreveport — MAINE: Augusta — MARYLAND: Baltimore, Hyattsville — MASSACHUSETTS: Hyde Park, Newton Highlands, Worcester — MICHIGAN: Detroit, Grand Rapids — MINNESOTA: Duluth, Minneapolis — MISSISSIPPI: Jackson — MISSOURI: Joplin, St. Louis — MONTANA: Billings, Great Falls, Kalispell, Missoula — NEBRASKA: Omaha — NEW HAMPSHIRE: Manchester — NEW JERSEY: Cranford, Kingston — NEW MEXICO: Albuquerque — NEW YORK: Albany, Binghamton, Buffalo, Long Island City, Newburgh, Rochester, Saugerties, Syracuse, Whitesboro, Woodside (L.I.) — NORTH CAROLINA: Charlotte — OHIO: Cincinnati, Cleveland, Columbus, Dayton, Toledo — OKLAHOMA: Oklahoma City, Tulsa — OREGON: Portland — PENNSYLVANIA: Bethlehem, Harrisburg, Philadelphia, Pittsburgh — RHODE ISLAND: Providence — SOUTH CAROLINA: Columbia — SOUTH DAKOTA: Rapid City, Sioux Falls — TENNESSEE: Chattanooga, Knoxville, Memphis, Nashville — TEXAS: Dallas, El Paso, Houston, Lubbock, San Antonio — UTAH: Salt Lake City — VIRGINIA: Richmond, Roanoke — WASHINGTON: Seattle, Spokane — WEST VIRGINIA: Clarksburg, South Charleston — WISCONSIN: Milwaukee — WYOMING: Casper.

INDUSTRY NEWS

Cover Picture

ON THIS MONTH'S COVER is an illustration of the Dolomite Products, Inc., Gay, Fla., plant near Brooksville. It is completely mechanized and electrified throughout for push-button control. The plant is designed to produce 40 t. p. h. of finely ground high calcium agricultural limestone, using a Kennedy-Van Saun 6- x 12-ft. rod mill for pulverizing. An oil-fired furnace and fan supplies hot air to rod mill to dry material while it is being ground. Raw material is obtained as screenings from the nearby Camp Concrete Rock Co.

Honor British Speaker

COLONEL H. E. PEIRCE, chairman of the Ballast Sand and Allied Trades Association of Great Britain, was feted by directors of Southern California Rock Products Association and Southern California Ready Mixed Concrete Association, at a dinner at the Beverly Hills Hotel, Beverly Hills, Calif. Noel J. Redmond, president of the ready-mixed concrete association, and president of Blue Diamond Corp., was master of ceremonies at the dinner, attended by 39 members. During his visit in Southern California, Colonel Peirce inspected sand and gravel and ready-mixed concrete plants in the Los Angeles area, and also visited Las Vegas, Nev., where he toured Blue Diamond Corp.'s gypsum plant.

Colonel Peirce was guest speaker at the Joint Luncheon of the National Sand and Gravel Association and National Ready Mixed Concrete Association at the convention in Miami, Fla.

To Triple Expansion

UNITED STATES GYPSUM CO., Chicago, Ill., plans to spend three times as much on expansion in 1955 as it did during 1954 on plant additions and improvements. C. H. Shaver, chairman of the board, stated that the gypsum demand during 1954 was such that the company's plants were unable to keep up with orders, despite continuous 24-hour-a-day operations. An 11.5 percent increase in sales during 1954 was attributed to a gain in unit sales, according to Mr. Shaver, since prices had increased only 1 percent from 1953. Net income for 1954 was reported at $32,371,015, or $19.89 per share, compared with $19,558,708, or $11.88 per share in 1953. Total sales for 1954 amounted to $216,997,318, against $194,589,946, during 1953.

Belgian-Backed Cement Plant

SOGEMINES, LTD., a Canadian investment firm backed by Societe Generale de Belgique and other Belgian interests, is planning to build a $7,000,000 cement plant at Edmonton, Alberta. A new firm, Inland Cement Co., will be formed to own and manage the plant, which is expected to have an annual capacity of 800,000 bbl. The plant is scheduled for completion by mid-1956, and will produce oil well cement and cement for construction in acid and sulfate water.

Buys Dolomite Property

KAISER ALUMINUM AND CHEMICAL CORP., Oakland, Calif., has announced the purchase of 353 acres of dolomite property adjoining its Chemicals Division plant at Natividad, Calif. The acquisition extends the firm's holdings in Monterey and San Benito Counties to approximately 750 acres, including operational areas and dolomite reserves. Dolomite quarrying and processing is done at the Natividad plant, and calcined dolomite is shipped to the corporation's seawater plant at Moss Landing, Calif., for processing into magnesia. The magnesia is then processed into high temperature refractory brick and grains.

Crushed Stone Distributor

CONSTRUCTION STONE CORP., Cleveland, Ohio, has been formed by S. F. Dupont, former marine superintendent, Nicholson Transit Co.; H. L. Bliss, general manager, Nicholson Materials Co.; and T. B. Whittlesey, to act as distributor of crushed stone for United States Steel Corp's Michigan Limestone division. The new concern, joined with a Cleveland steamer operator, will begin operations in spring, handling sales for the calcite quarry at Rogers City, Mich., and the Port Dolomite quarry near Cedarville. G. G. Garland, Cleveland, Ohio, is president of the company.

Southern California sand and gravel and ready-mixed concrete producers recently held a dinner in honor of Colonel H. E. Peirce, chairman of the Ballast, Sand and Allied Trades Association of Great Britain

Best Managed Companies

THE AMERICAN INSTITUTE OF MANAGEMENT has awarded Certificates of Management Excellence to 16 companies for 1954, in its sixth annual management survey. Companies listed in more than one subcategory are: Philip Carey Manufacturing Co., Lockland, Cincinnati, Ohio; Harbison-Walker Refractories Co., Pittsburgh, Penn.; National Gypsum Co., Buffalo, N. Y.; Pittsburgh Plate Glass Co., Pittsburgh, Penn.; Ruberoid Co., New York, N. Y.; and United States Gypsum Co., Chicago, Ill.

In the category for abrasive asbestos and miscellaneous nonmetallic mineral products, the following were listed: Formica Co., Cincinnati, Ohio; Johns-Manville Corp., New York, N. Y.; and Raybestos-Manhattan Inc., Passaic, N. J.

In the category for cement and concrete companies were: Lone Star Cement Corp., New York, N. Y., and Ideal Cement Co., Denver, Colo.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 23,841,000 bbl. of finished cement in November, 1954, as reported by the Bureau of Mines. This was an increase of 6 percent over the November, 1953, figure. Mill shipments totaled 22,781,000 bbl., 17 percent more than in November 1953, while stocks were 18 percent less than those on hand for the same date a year ago. Clinker production during November, 1954, totaled 23,665,000 bbl., an increase of 5 percent from the November, 1953, total. The output of finished cement during November, 1954, came from 157 plants located in 37 states and Puerto Rico. During the same period of 1953, 22,529,000 bbl. of finished cement were produced.

Modernizes Cement Plant

ASH GROVE LIME AND PORTLAND CEMENT CO. is modernizing its Chanute, Kans., cement plant, to maintain normal plant capacity. Increased production demands were met during the past few years through continuous operation for longer periods than normal, according to K. W. Wright, plant superintendent. Plans call for a new kiln and additional grinding facilities; the enlargement of three present buildings; and additional storage facilities. The plant has been operating since 1907, and will continue production during the remodeling program.

Expands Potash Plant

INTERNATIONAL MINERALS AND CHEMICAL CORP., Chicago, Ill., has announced an expansion program for its potash plant at Carlsbad, N. M., costing approximately $1,000,000. About 40,000 tons per year are expected to be added to the capacity for production of sulphate of potash.

Plans Chicago Cement Plant

MARQUETTE CEMENT MANUFACTURING CO., has announced plans to build a cement plant in the Chicago area, which would produce 1,500,000 bbl. of cement annually. The company owns land near the Sanitary and Ship canal, which is one of the sites under consideration. Shipping facilities will be a major factor in determining the plant site, and possible sources of raw material are also being considered. Marquette has its main office in Chicago, and is one of the largest cement producers in the country. It operates cement plants in Illinois, Iowa, Missouri, Tennessee, Ohio, Mississippi, and Georgia.

Anticipates Larger Market

AMERICAN MATERIALS CORP., Hamilton, Ohio, anticipating a larger market for paving materials in the next few years, is building a sand and gravel plant near Hamilton, estimated to cost approximately $500,000. Walter B. Evans, general manager, reported that 1954 was the firm's biggest year, and that 1955 is expected to be even better. The company also operates a slag and gravel plant at New Miami, Ohio, and another sand and gravel plant at Middletown, Ohio, which began production in February, 1954.

Additional Expansion

CALAVERAS CEMENT CO., directors have approved an additional $545,826 expansion program for the San Andreas, Calif., cement plant. The program includes quarry, plant and shipping department improvements, as well as a new batching plant for a subsidiary firm, Stockton Building Materials Co. The new appropriation is for increased clinker storage, separators and elevators in the finish mill and four cement storage silos, increasing plant capacity by 5 percent.

Canadian Gypsum Plant

COLUMBIA GYPSUM CO., LTD., British Columbia, Canada, which recently acquired the Windermere quarry and Spokane Gypsum Manufacturing Co., has announced plans for large-scale quarrying and a possible second gypsum manufacturing plant near Windermere, B. C.

Tests Shale

GREAT WESTERN AGGREGATES, INC., is processing "bloat" shale to determine its usefulness as a lightweight aggregate. Processing is being done at the controversial alumina plant at Laramie, Wyo., built by the government for $7,000,000, and purchased by Ideal Cement Co. for $1,200,000. Great Western, a subsidiary of Ideal, is considering the utilization of plant facilities for the reduction of titanium and uranium ore and the processing of mineral feed phosphates.

Second Fire at Plant

THE LARSEN SAND & GRAVEL CO., Neenah, Wis., rebuilt after it was razed by fire recently, was again swept by fire after being in operation 10 days. Damages in each fire were estimated at $25,000 to $30,000, the first blaze being caused by an exploding heater unit, and the second by a short circuit.

Adds Ship to Cement Fleet

Huron Transportation Co. has added the Str. Presque Isle, Cleveland Cliffs Steamship Co.'s former flagship, as part of Huron Portland Cement Co.'s expansion program. The addition brings the total fleet to five; the S. T. Crapo, John W. Boardman, Paul H. Townsend, Samuel Mitchell and the Presque Isle. The ship has a capacity of 6800 long tons, is 413 ft. long with a 50 ft. beam and 28 ft. depth.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the months of January and February were listed by the Portland Cement Association as follows:

	Square Yards Awarded	
	January	February
Roads	2,769,011	3,635,124
Streets and Alleys	1,764,848	1,520,253
Airports	2,599,735	2,133,816
Totals	7,133,594	7,289,193

New Cement Plant

NEW ENGLAND PORTLAND CEMENT CO., a recently organized firm, is completing a cement plant at Portland, Maine, which will have a capacity of 4500 bbl. daily. The new company has acquired quarries in Rockland and Lincolnville, Maine, which are said to have sufficient supply for 50 years. It also has acquired shore front property where a pier is to be built to facilitate cement shipping.

Ceylon Cement Bids

THE CEYLON GOVERNMENT is inviting bids until April 26, for the supply of 6000 tons of portland cement for the Government Stores Department. Specifications are available for review on loan from the Commercial Intelligence Division, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., or the Embassy of Ceylon, 2148 Wyoming Ave. N.W., Washington, D. C. Bids should be sent direct to the Chairman, Tender Board, Ministry of Finance, P. O. Box 500, Colombo, Ceylon.

Sand and Gravel Plant

SIDNEY SAND AND GRAVEL CO., Sidney, Ohio, is building a sand and gravel plant southwest of the city, which is expected to almost double the capacity of its present plants. William F. Milligan is president of the firm.

Expands Cement Plant

CONSOLIDATED CEMENT CORP., Chicago, Ill., is expanding its Fredonia, Kan., cement plant. A 425-ft. kiln and additional grinding equipment now being installed, is expected to increase annual production by 1,300,000 bbl. of cement. The corporation also has a cement plant at Cement City, Mich.

Opens Sales Office

NATIONAL GYPSUM CO., has announced the opening of its Indianapolis, Ind., district sales office, located at Suite 704, Chamber of Commerce Building, 320 N. Meridian St. John P. Hayes is district sales manager.

Burma Cement Bids

THE INDUSTRIAL DEVELOPMENT CORP. of Burma has invited international bids for the supply and installation of equipment to double the present capacity of 60,000 long tons annually, at the portland cement plant of the nationalized Burma Cement Co. at Thayetmyo, Burma.

Asbestos Development

PHILIP CAREY MANUFACTURING CO., Lockland, Ohio, has announced plans for the development of a recently discovered asbestos deposit near East Broughton, Que., Canada, at a cost of approximately $7,500,000. The deposit will be developed through Quebec Asbestos Corp., a wholly owned subsidiary.

Gypsum Board Plant

UNITED STATES GYPSUM CO., Chicago, Ill., is planning to build a gypsum wallboard plant at Stony Point, N. Y., on a 50-acre tract beside the Hudson River. The plant is scheduled for completion by November, 1955, and will have a capacity of 20 carloads of gypsum per day.

Sells Limestone Quarry

KELLEY ISLAND CO. recently sold its Marblehead, Ohio, fluxstone quarry and Lakeside and Marblehead Railroad for $2,550,000 to Marblehead Limestone Corp., of Marblehead, Ohio, a wholly-owned subsidiary of Minerals and Chemicals Corp.

Increases Cement Prices

CALAVERAS CEMENT CO., San Francisco, Calif., has increased cement prices to 15 cents per bbl. on all cement except portland and pipe cement. Pipe cement is being sold at 20 cents per bbl. over regular cement, and portland cement prices remain the same.

Accident-Free Driving

CALAVERAS CEMENT CO., San Francisco, Calif., recently celebrated its 2,000,000th consecutive mile of accident-free driving. B. R. Caldwell, California Highway Patrol commissioner, presented the 67 drivers of the company's truck and trailer fleet with a letter of commendation.

Stock Split

DIRECTORS OF NEW ENGLAND LIME CO., Adams, Mass., have approved a three for one stock split, with par value reduced from $5 to $2.

New Lime Plant

NORTHERN LIME CO., is building a new lime plant near Kimberley, South Africa, at a cost of approximately $3,500,000. Facilities will include five rotary kilns. The deposits, which were found beneath the surface of dry cattle farms, were not discovered until 1951.

Dragon Cement Income

DRAGON CEMENT CO., INC., reports a net income of $1,368,369, or $2.68 per share for the 12 months ended September 30, 1954. This compares with the 1953 net income of $1,059,761, or $2.08 per share.

Proposed Stock Increase

SHAREHOLDERS OF GENERAL PORTLAND CEMENT CO., Chicago, Ill., will vote on a proposal to increase the number of authorized common shares to 3,500,000 from the present 1,750,000. Par value would remain at $1 per share, and a charter amendment would provide for a 2 for 1 stock split, according to Smith W. Storey, president.

Improvement Plans

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has announced improvement plans, costing approximately $1,129,000. Plans include modernization of its Superior, Ohio, cement plant, increasing production from 1,000,000 to 1,250,000 bbl. annually, as well as improvements at other plants. A new office building is being built at Des Moines, Iowa.

Canadian Potash Development

INTERNATIONAL MINERALS AND CHEMICAL CORP. was granted approximately 600,000 acres of property by the Saskatchewan, Can., government, for the development of potash beds near Yorkton. Potash Co. of America and Duval Sulphur and Potash Co. have also announced plans for development of potash beds in Saskatchewan.

Opens Sand Pit

FENNER-CRANE AND CONSTRUCTION SERVICE CO., Muskegon, Mich., has purchased a 30-acre tract in Cedar Creek Township, Mich., for sand recovery operations. The sand will be sold as hardtopping road mix and for construction work by the Great Lakes Dock and Materials Corp.

Leases Quarry

R. B. ABBOTT, Weeping Water, Neb., has leased 80 acres of limestone property on the John Arends farm near Ponca, Neb. Quarrying operations have been started and a new screening plant placed in operation.

Installs Dust Collector

PEERLESS CEMENT CORP., Detroit, Mich., is installing a stack dust collecting system, in its plant at Port Huron, Mich., to eliminate air pollution in the nearby residential district. The system will cost approximately $250,000.

Coming Conventions

April 21-22, 1955—
Prestressed Concrete Institute, 1st Annual Meeting, Lagamar Hotel, Fort Lauderdale, Fla.

May 11-13, 1955—
National Industrial Sand Association, Spring Meeting, The Homestead, Hot Springs, Va.

May 17-18, 1955—
Empire State Sand, Gravel and Ready Mix Association, Fourth Annual Meeting, Hotel Rochester, Rochester, N. Y.

June 26-July 1, 1955—
American Society for Testing Materials, 58th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

HINTS AND HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Temporary Primary Crusher Set-Up

WITH PRESENT HIGH FREIGHT RATES, aggregate producers often have to move a plant to the construction site instead of moving finished material from a permanent plant. Some operators have developed a technique in moving a plant from site to site that is simple and efficient.

The illustration shows how one producer used logs as the structural members of a holding hopper ahead of the

Logs comprise primary crusher set-up at temporary plant

primary crusher. A dirt ramp leads to the hopper. After the job is completed, a crane lifts out the 25- x 40-in. Universal jaw crusher and the reciprocating feeder serving it, and no high-cost construction remains at the abandoned plant site.

"Pendulum" Conveyor

SEVERAL WESTERN SAND AND GRAVEL PRODUCERS use the so-called pendulum conveyor in the pit to gain flexibility. Under this system a "can" or feed hopper is filled by the shovel, and under this hopper is a feeder, either apron or reciprocating, which delivers material to a wide belt conveyor leading to the plant.

Usually the feed hopper and the conveyor frame are assembled together as a unit of exceptionally rugged construction so that the shovel can "inch" the pendulum around the pit in almost a circle. Thus, if the pendulum conveyor is 225 ft. long, a circular swath can be cut that is of this

A 2½-cu. ft. shovel fills 14-ft. dia. "can" or hopper serving eccentric feeder which feeds two 36-in. belt conveyors in series

radius plus the reach of the shovel boom and bucket. Hence, with a face upwards of 200 ft. a very large tonnage can be excavated before the pendulum belt conveyor must be moved as an entirety.

The two illustrations show an adaptation of this idea, but in this case two portable belt conveyor lengths are used as the pendulum section. These sections are independent of each other and of the 14-ft. diameter "can" or hopper under which is a reciprocating feeder. A 2½-cu. yd. Northwest shov-

Two 36-in. portable field belt conveyors served by "can" or hopper. These short sections of belt conveyor in turn serve two 30-in. belt conveyors, 220 and 230-ft. centers, extending to a surge pile. From the surge pile, two other 30-in. belt conveyors deliver material to plant

el, equipped with a Murphy diesel power unit, feeds the belt conveyor system. Conveyor belts are 36 in. wide for the portable sections. These belts in turn feed to 30-in. belt conveyors, 220 and 230-ft. centers, that deliver to a surge pile near the bottom of the pit. From the surge pile, two 30-in. belt conveyors, 200 and 290 ft. centers, deliver material to the plant located on the rim of the pit.

Sand-Clay Separation

IN A CALIFORNIA SAND AND GRAVEL PLANT producing asphalt sand (as well as other types), the enforcement of the state's "Sand Equivalent Test" has left its mark. To meet the test's requirements, all sand has to be washed, and this means a loss of 200 to 325 mesh and finer sand (and mineral filler) for asphaltic work.

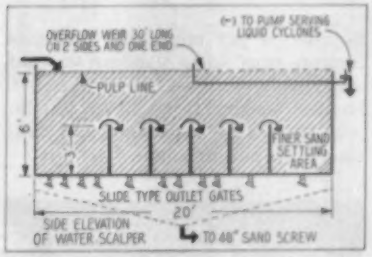
The clay in the sand at the plant under discussion, while comparatively high, is not too firmly bonded to the grains so that more or less conventional scrubbing in a rotary scrubber followed by screening and rinsing does an adequate job. The problem then involves methods of recovering the extremely fine sand sizes from the clay pulp.

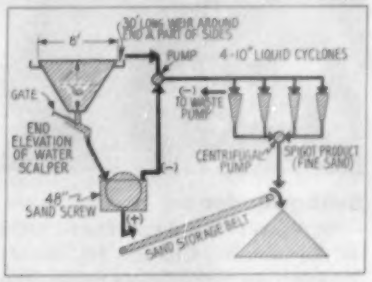
This company built a "specific gravity tank" for this purpose which is essentially a water scalper. It has a rectangular surface, 8- x 20-ft., and is 6 ft. deep. In cross section it is cone-shaped. The tank is divided into six compartments with the dividing walls about 3 ft. high, extending from the bottom upwards. The first and last compartments are larger than the others.

Pulp flows in one end and the overflow weir is at the opposite end (and two sides). The weir length is 30 ft. Pulp flows into the unit at 600 g.p.m. or from 100 to 150 t.p.h. of sand, de-

Above: Six-compartment specific gravity tank or water scalper. Weir overflow in foreground. **Below: Outlet slide-type gates** of water scalper shown at (A)

pending on pit conditions. The coarser sand grains settle in the first compartment and the finer sand settles progressively in the remaining five compartments. In the first compartment are four outlet gates; in the second is


OVERFLOW WEIR 30' LONG ON 2 SIDES AND ONE END
(+) TO PUMP SERVING LIQUID CYCLONES
PULP LINE
FINER SAND SETTLING AREA
SLIDE TYPE OUTLET GATES
20'
SIDE ELEVATION OF WATER SCALPER
TO 48" SAND SCREW



Above: Side elevation of water scalper. **Below: End elevation** of water scalper and arrangement for storing sand

one gate; two in the third and fourth compartments; and one each in the last two. With these slide gates, an operator controls the amount withdrawn through the gates.

The sand collected falls to a 48-in. Wemco sand preparation machine for dewatering. Overflow from the water scalper and from the Wemco screw is picked up by a pump and delivered to a battery of four Krebs liquid cyclones that recover up to 97 percent of the plus 275 mesh sand. The four liquid cyclones, served by one pump, are operated in parallel. The cyclones are 10 in. dia. A Galigher rubber-lined pump picks up the fine sand from the Krebs cyclones and delivers the pulp to a point above the sand storage pile where it is blended with production from the Wemco machines.

Blending Sand

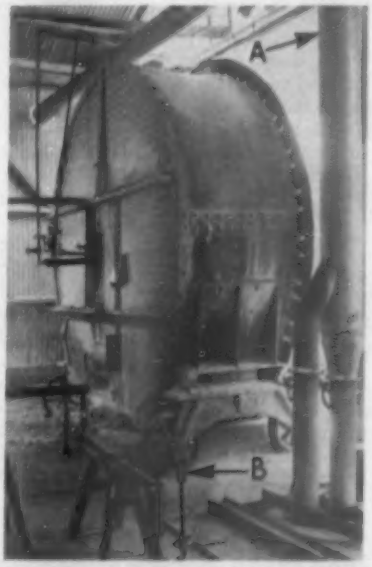
BLENDING SEVERAL SIZES OF SAND can often lead to complications. One western producer whose deposit was deficient in fine sand hauled what were essentially strippings from an adjacent area to the rim of the pit. For the haul, DW-20 Caterpillar earth movers were used. They were unloaded back from the rim of the pit, spreading the fine sand out as the units unloaded. Next operation was to use a Caterpillar tractor equipped with dozer blade to push the fine sand over the rim of the pit as needed. Two tractors were

Partial blending of sand in pit with the aid of scraper haulage unit that hauls fine sand and dumps it into pit as needed

in use. One had a U-shaped blade which was more efficient for the long hauls. A 38-B Bucyrus-Erie shovel loaded the mixture to a 17-cu. yd. DW-10 bottom dumper that delivered the blend to the washing plant.

Lime Kiln Preheater

AT A WESTERN LIME PLANT, the rotary kiln is equipped with a novel preheater. Hot lime from the kiln falls to a pit below the burner floor that is kept full of ¾-in. and 1½-in. lime at all times. Air is forced through this bed of hot lime to preheat it. A bucket elevator picks up the lime from the preheater pit and, to make sure that the pit is always reasonably full of material, a gate operates as an eccentric feed from the pit to the bucket



Cam arrangement that feeds cooled lime to bucket elevator from preheater pocket so that pocket is always about full of lime from kiln. At (B) may be seen eccentric, and (A) is the pipe to carry preheated air

elevator. A small eccentric device located on the burner floor operates the gate. In the illustration, the eccentric is at (B) with the air pipe at (A).

By the use of this device, a steady, controlled amount of cooled lime is taken out of the pit by the bucket elevator which balances the flow of hot lime to the pit from the kiln.

Ship Wallboard on Flat Cars

AT A WESTERN GYPSUM WALLBOARD PLANT, practically all the output is shipped on flat cars. This plant is along the tracks of the Union Pacific

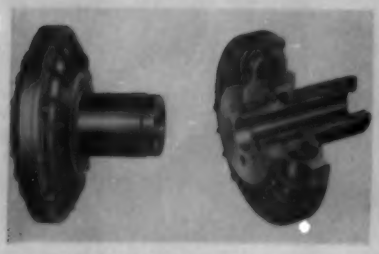
Loading wallboard for shipment on flat cars. Note movable bridge on platform to span loading dock and flat car

railroad which has assigned some 68 cars to this service. Each car has steel bulkheads at each end. The cars shuttle to markets and back to the plant.

Loading is designed so that the receiver can unload with fork lift trucks. For this purpose, a spacer is inserted between decks of each lot of board. The spacer is usually a strip of wallboard or gypsum lath. In the illustration, a Hyster fork lift truck (one of three) is loading one of the cars.

After the car is loaded, it is covered with a water-proofed paper that has a fabric lining. The protective cover is lashed into place. The loading dock at this plant is almost 800 ft. long.

NEW MACHINERY



Dry Fluid Drive

DODGE MANUFACTURING CORP., Mishawaka, Ind., has announced "Flexidyne," described as a dry fluid drive. It is composed of a housing, inside of which a rotor is free to turn concentrically. Between the two are placed a charge of fine particles of spherical steel shot, called the "flow charge," which acts as a fluid. The flow charge transmits power from the housing to the rotor, and is easy to seal in, has a high density, and can stand relatively high temperatures. The drive can be set to slip from 20 percent over full load torque to peak motor torque for overload protection. During starting and overload periods, the current draw is at a minimum because with the standard drive setting the motor is reported not to pull down to less than 90 percent of synchronous speed. Two lines are available: drives for mounting directly on motor shafts and adapted for Dodge Taper-Lock sheaves; and couplings with Taper-Lock bushings for straight line drives. Drives are available presently in four sizes, rated at 3 to 30 hp., at 1800 r.p.m.

Suction Dredge Agitator

W. H. PFARRER CO., Chicago, Ill., has introduced the "Agipeller" suction dredge agitator, designed specifically for sand and gravel deposits which do not "cave" readily, or in loose deposits containing a large number of oversized stone. The oscillating agitator is activated by hydraulic power from the deck of the dredge, eliminating heavy weights, long shafting, bearings, couplings, chains and pins. Rows of manganese steel teeth sweep back and forth in front of the suction nozzle, to cut and loosen compacted deposits, and push aside large objects. If tramp iron or other obstructions become wedged in the nozzle, the agitator automatically reverses itself to avoid damage. The hydraulic pump may be direct-connected to a motor, or run off a jack shaft by V-belt drive.

Vibrating Feeder

BARBER-GREENE CO., 400 N. Highland Ave., Aurora, Ill., has brought out the "Redi-Flow" vibrating feeder, a lightweight unit available in 20 and 26 in. widths for feeding 24- and 30-in. belts. It can handle stone up to 12 in. size when mixed with fines, or up to 8 in. maximum when they are of uniform size. The capacity, dependent upon the size and type of the material handled, averages about 200 t.p.h. for the 20-in. unit, and 300 t.p.h. or more for the 26-in. unit. It discharges close to the belt to prevent damage to the belt or carriers, and vibration in the hopper and feeder is designed to eliminate segregation and deposit heavy pieces in a bed of fines. The material is propelled in the direction of belt travel at the moment of transfer from feeder to belt, and is deposited directly and evenly in the center of the belt. Other features include a leak-proof, abrasion resistant feeder pan, and ground and polished steel shafting.

Bag Filling Machine

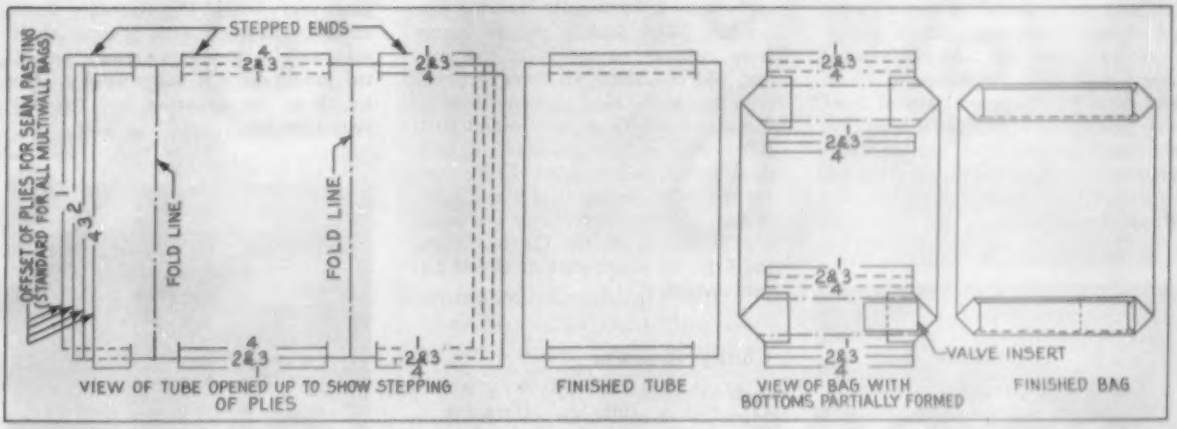
KRAFT BAG CORP., 630 Fifth Ave., New York 20, N. Y., has announced an automatic open mouth filling machine which can handle 22 to 24 100-lb. charges per min., with one man hanging bags, using standard size and standard type open mouth bags. It handles weights from 25 to 200 lb., with an average variance of not more than 8 oz. plus or minus.

Swing Loader

PETTIBONE MULLIKEN CORP., 4700 W. Division St., Chicago, Ill., has introduced the Speed Swing loader with a 180-deg. boom swing, permitting load discharge to the left or right, as well as in front. It is available in ¾ and 1-cu. yd. bucket models, and has a 30-deg. bucket tilt-up for full loads. Two or four-wheel drive and optional four-wheel steering is available. Standard features include: torque converter transmission system; forward-reversing lever; hydraulic steering; four-wheel hydraulic booster brakes and full hydraulic control; bucket float control; replaceable bucket lip; ball bearing turntable; and heavy-duty axles.

Locomotives

GENERAL ELECTRIC CO., Schenectady 5, N. Y., has brought out two small locomotives, the 1½-ton trammer and a 10-ton diesel. The 1½-ton diesel trammer is designed for both surface and underground hauling, and runs on either an 18- or 24-in. gauge track. It is 3 ft. wide, 4½ ft. high and 6 ft. long, but can be shortened to 4 ft. for lowering on mining hoist cages. The 10-ton unit is designed for industrial plant switching and other surface uses such as in quarries.


STEPPED ENDS
OFFSET OF PLIES FOR SEAM PASTING (STANDARD FOR ALL MULTIWALL BAGS)
FOLD LINE
FOLD LINE
VIEW OF TUBE OPENED UP TO SHOW STEPPING OF PLIES
FINISHED TUBE
VIEW OF BAG WITH BOTTOMS PARTIALLY FORMED
VALVE INSERT
FINISHED BAG

Stepped-End Multiwall Bag

ST. REGIS PAPER CO., 230 Park Ave., New York 17, N. Y., has developed, in cooperation with its associated European companies, a stepped end pasted multiwall bag which has overlapping plies at both ends for added strength and flexibility. Three separate paste lines along the plies provide a bonding of each ply to itself. The bag was originally developed in Europe by Edgar B. Hoppe, European manager of the International Division, in 1928. St. Regis developed and patented the stepped end bag construction and the practical method for its manufacture in 1933. Further improvement in the equipment for its manufacture was begun, and at the conclusion of World War II, the firm ordered its first stepped end tuber for operations in the United States. The Bag Engineering Department at Pensacola, Fla., began the design of a bottomer to be used in conjunction with it, which closes the bag which has been formed on the tuber.

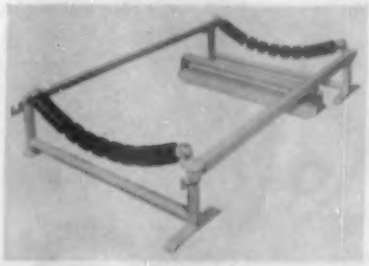
A stepped end, stepped corner bag was also developed, with symmetrical stepping on the four bag corners. This bag was developed by Alexander Gelbcke of the St. Regis plant in Belgium, and a U. S. patent has been applied for. It is of heavier and larger construction for applications where extreme siftproofness is required. The present stepped end bag is being used extensively by the U. S. cement industry, necessitating expansion of the firm's bag manufacturing facilities. A stepped end unit was recently added at its plant in Pensacola, Fla., and a tuber is being installed at its machine shop at East Providence, R. I.

Breaker—Drill

STANCO MANUFACTURING AND SALES CO., 1931 Pontius St., Los Angeles 25, Calif., has introduced the Pionjar gasoline-driven drill which can be converted into a breaker. The unit weighs 86 lb., and has a built-in, air cooled, single cylinder, two stroke engine. A floatless carburetor permits drilling at an angle, horizontally or 45 deg. above horizontal. Drilling speed is about 16 in. per min. with a 1.06-in. dia. bit in medium hard granite and approximately 10 in. per min. with a 1.34-in. dia. bit. Drilling depth is 13 ft., and a continuous blower cleans the hole as it bores. Specially designed hollow, tungsten carbide drill steels are available with plain or collared shanks.

Hard-Facing Electrode

MIR-O-COL ALLOY CO., INC., 312 North Avenue 21, Los Angeles 31, Calif., has introduced a line of electrodes, designated Moly-Mang, designed specially for build-up work on manganese castings. It has a deposit hardness of 5 to 10 Rockwell C, and is said to harden to 50 Rockwell C when subjected to peening or impact. It is applied by ac-dc electric arc with reverse polarity. High tensile strength is claimed for the rod, making it useful for applications including frogs and switches.



Belt Conveyor Idler

JOY MANUFACTURING CO., Henry W. Oliver Bldg., Pittsburgh 22, Penn., has brought out a cable-suspension idler for belt conveyors, known as the "Limberoller." It utilizes two bearings, and carries the belt on resilient, pressure-molded, neoprene discs of the same size, revolving at the same peripheral speed. In continuous contact with the loaded belt, the discs exert a slight gripping action, tending to maintain belt alignment and hold slippage to a minimum. The discs are said to resist abrasion and chemicals other than strong oxidizing agents and aromatic hydrocarbons. The bearings are supported above and to each side of the belt; are locked in place with spring clips; and can be changed without interrupting material flow.

The idler is slot-mounted in special bracketed stands, which are assembled into conveyor sections, by means of bed-frame-type channel rails. Brackets are also available for mounting to a conventional section. The idler is available for conveyor heights from 13¼ to 15¾ in., and belt widths of 24, 30 and 36 in.

Crane—Excavator

DIXIE CRANE & SHOVEL CO., 2343 N. 7th St., Harrisburg, Penn., has brought out the "Dixie Crane," a high-speed excavator, featuring hydraulic controls with separate master cylinders for each working part. Crane, shovel or trench hoe rigs are available on either rubber-tired crane carrier or on 20-in. crawlers. Attachments for dragline, clamshell, magnet, pile driver, grapple or concrete bucket work are available. Crane rigged, on rubber tires, it has a lifting capacity of 6 tons with the standard 25-ft. boom at a 10-ft. radius. Boom inserts of 5 and 10 ft. and a jib can be furnished to supplement the two 12½-ft. standard

sections. As a shovel, it has a ⅜-cu. yd. bucket equipped with a power-operated dipper trip, and excavates to a height of 18½ ft., dumps at 13 ft., and digs 2½ ft. below ground level. For trench hoe operation, it cuts 13½ ft. below ground, and has an above ground clearance of over 15 ft. at end of dump. The trench hoe reaches 23½ ft. at ground level.

Rear Dump

LeTourneau - Westinghouse Co., Peoria, Ill., has increased the capacity of its Model C rear dump unit from 18 to 22 tons. The struck capacity of the unit is now rated at 14.7 cu. yd., and heaped capacity, 17 cu. yd. The width of the unit has been increased 10 in. at the top, and the top length has been increased 2 in. to provide for the additional capacity. Ground clearance is 22 in., 8 in. less than previously. It is mounted on 21.00 x 25 24-ply tires, has a maximum turning angle of 90 deg., left and right, and has multiple-disc air brakes on all four wheels. Forward speeds range from 2.5 to 29.2 m.p.h. with constant mesh transmission, and with sliding gear transmission, range from 2.9 to 30.2 m.p.h., at 2000 r.p.m.

Single-Pass Crusher

Universal Engineering Corp., Cedar Rapids, Iowa, has brought out the TS-Traveler, a gravel screening, crushing and loading plant which replaces the original Traveler. It consists of a 1½-cu. yd. shovel loading hopper with trap grate, reciprocating 19-in. plate feeder, 2- x 4-ft. inclined gyrating screen, a 1024 roller bearing jaw crusher, 24-in. folding channel frame front delivery conveyor, clutch control, and operator's platform mounted on a pneumatic tired gooseneck truck. It is also available with 1016 and 1020 roller bearing jaw crushers. A two-deck screen and a side delivery conveyor for producing sand are also offered. The Traveler plants are available in three types, the TS, the CS and the CSE for single-pass or closed circuit operation.

Clinker Breaker

Allis-Chalmers Manufacturing Co., 975 S. 70th St., Milwaukee 1, Wis., has introduced a clinker breaker as auxiliary equipment for its air-quenching clinker cooler. It is designed to crush chunks of clinker discharging from the cooler, using the repeated impacts of the cooler's reciprocating motion. Clinker which cannot pass 3-in. openings in the horizontal grizzly deck are crushed between metal fins mounted on the cooler discharge end and eccentric discs on the breaker shaft. The breaker carriage rides on rails, and pressure from air cylinders holds the carriage close to the cooler. The air cylinders retract to permit the carriage to back off sufficiently to accomodate large clinker. The clinker breaker is mounted on concrete piers and extends about 11 ft. beyond the cooler discharge.

Suspended Conveyor

Syntron Co., 450 Lexington Ave., Homer City, Penn., has brought out the Model 2-B balanced conveyor with steel troughs for suspension from the ceiling and remotely controlled from the operating floor. It handles dry bulk materials, cold or hot, up to 1000 deg., abrasive or corrosive. A stainless steel division strip in the center of each trough accomodates discharge gates and chutes. The conveyor drive eccentric is fitted with Syntron shaft seals to eliminate lubrication. Size of the motor drive is determined by the length of the conveyor and tonnage requirements.

Self-Propelled Scraper

LeTourneau-Westinghouse Co., Peoria, Ill., has announced the 23-cu. yd., single-engine, self-propelled, "B-Tournapull" scraper. It is powered by a 293-hp. diesel, with a choice of Cummins or General Motors engine, and offers 10 gear ratios ranging from 2.4 to 28.4 m.p.h. Features include a high apron lift; wheels inside the cutting edge of the scraper blade; power steer steering wheel; and full-shift fuel supply. A release on the scraper permits gravity drop of the bowl, and hoisting is handled by electric controls. This feature allows "pumping" of loads, for working in sand and loose materials, or to keep material boiling for big loads. Struck capacity of the scraper is 18 cu. yd., and heaped, 23 cu. yd. without sideboards. Overall length of the model is 40 ft. 6 in., and it is 11 ft. 8 in. wide and 12 ft. 7 in. high.

The scraper is interchangeable with a 35-ton rear dump, rated at 23 cu. yd. struck and 27 cu. yd. on a 2-to-1 heap without sideboards.

Pressure Lubricant

Pressure Products Co., P. O. Box 342, West Chester, Penn., has brought out Spray-Lube, an extreme pressure lubricant for spray lubrication of open

gears, open chains, valve stems, etc. The product is said to have adhering qualities for rust prevention, and may be applied in temperatures too high for conventional grease or oil. It is furnished in an unbreakable Aerosol dispenser.

Dump Bodies—Hoists

THE GALION ALLSTEEL BODY CO., Galion, Ohio, has introduced a line of telescopic hoists and matching dump bodies, for use on tandem axle trucks. Designated Duo-scopic Models 55381 and 66381, the hoists feature forward mounting of telescopic cylinders, which along with the subframe design, moves body, hoist and load weight forward onto the truck's front axle. This is said to permit up to 1500 lb. additional payload. The hoist cylinders are equipped with self-adjusting aircraft-type chevron seals, and special wiper rings are incorporated to prevent dirt from damaging the seals. Rated capacity of the Model 55381 is up to 18 tons, and Model 66381 lifts up to 22 tons. Both models are available in center or outrigger type mounting. The line of hoists is suitable for mounting with Models 12N-3, 12N-4, 12N-5 and 12N-7 Galion Allsteel dump bodies.

Sectional Belt Conveyor

STEPHENS-ADAMSON MANUFACTURING CO., Aurora, Ill., has brought out a set of belt conveyor components, pre-engineered for customer assembly. The components include the S-A 745 carrier and return roll, head and tail pulley assemblies, drive assembly, normal duty roller type holdback, spring type belt cleaner, bent plate decking, belt and Swivelpiler for extending storage area at conveyor discharge. A choice is offered of either a Saco speed reducer drive with overhead motor mounting, or a shaft mounted reducer. The components are available as repair of replacement units, or as a package unit for a complete belt conveyor installation. Units are designed for lengths up to 50 ft., and from 51 through 100 ft. in both 18- and 24-in. belt widths. The 18-in. belt has a capacity of 150 t.p.h., while the 24-in. belt has a capacity of 250 t.p.h.

Hammermill Crushing Plant

UNIVERSAL ENGINEERING CORP., Cedar Rapids, Iowa, has introduced a two-unit hammermill crushing, screening and loading plant, designed for operation in wet, sticky materials, and in quarries contaminated by clay balls and mud pockets. The hammermill is equipped with a moving breaker plate to prevent build-up of material in the breaking chamber, and a moving cleaning bar to keep the discharge free at all times. The portable hammermill unit consists of a 42-in x 12-ft. apron feeder with a shovel loading hopper, a Bulldog HM-04-NC Non-Clog hammermill, a 36-in. front delivery conveyor, an 18-in. return circuit conveyor, and an operator's platform, mounted on a steel gooseneck truck with pneumatic tires. All units are electric, push-button controlled, with the exception of the hammermill, which is diesel powered.

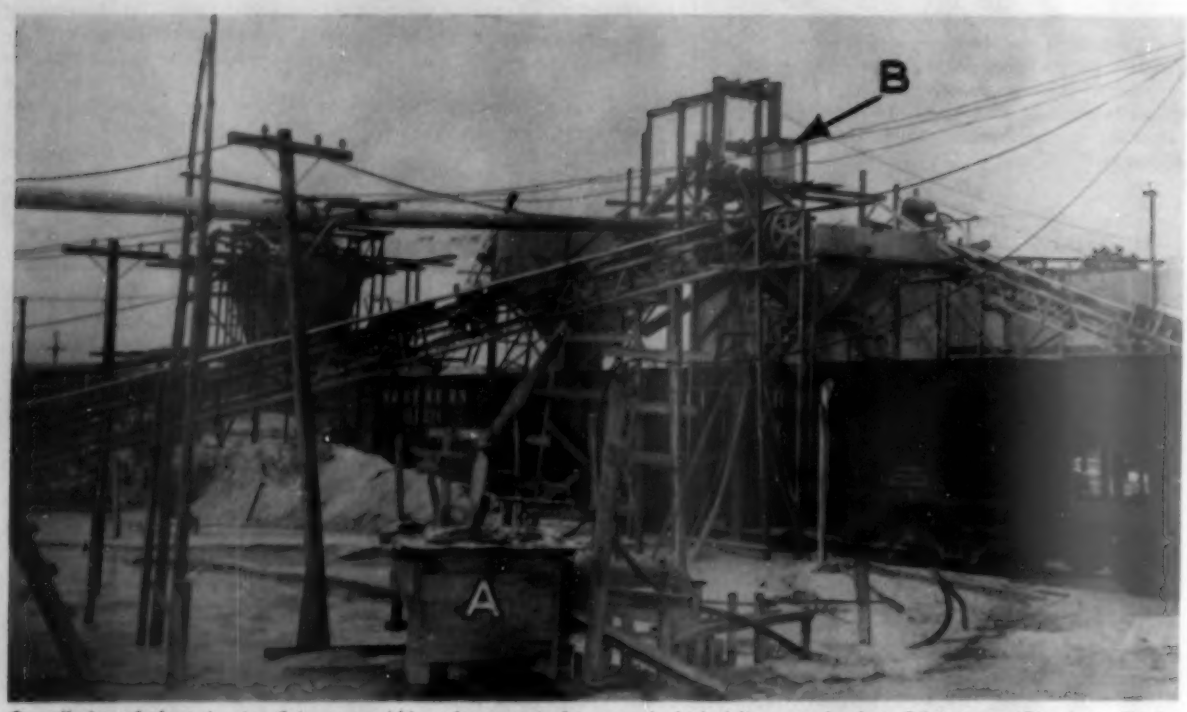
The Model 5142 portable screening unit consists of a 5- x 14-ft. double deck inclined gyrating screen with 70 sq. ft. of screening area in each deck and a ball tray deck for maximum efficiency when producing agstone; a 30-in. channel frame feed conveyor; a 30-in. front delivery conveyor; a 24-in. side delivery conveyor; and an 18-in. channel frame return circuit conveyor, all mounted on a pneumatic tired gooseneck truck. It is an all electric drive with the control panel located on the operator's platform of the crushing unit.

Front End Tractor Loader

MID-WESTERN INDUSTRIES, INC., Wichita, Kans., has announced the 1955 model of the Davis front end tractor loader; the Model 101 series for two to three-plow tractors and the Model 102 series, with twin dump cylinders, for three to four-plow tractors. Features include: double-strength lift arms, due to debossed box-type construction; down pressure on the lift rams; rubber mounting for minimizing the shock load on the front of the tractor; and shock slots for transferring the thrust to the rear. The loader also incorporates a centralized reservoir. Various attachments are available, including a scarifier for ripping hard surfaces.

Engine Wear Meter

THE GERIN CORP., Avon, N. J., has introduced the engine wear meter, a gauge for permanent attachment to the engine, which is designed to warn the operator against fuel dilution, water or antifreeze leakage, running on dead filters, wrong grade make-up oil, etc. It responds to an increase or decrease in viscosity, but does not respond to normal thickening or thinning of oil incidental to varying operating temperatures. Accuracy within 1 percent is claimed, and the internal movement is reported not to vibrate when the instrument is subjected to vibration and shock. When the engine is worn out, the meter can be transferred to the replacement unit.



Overall view of plant showing 6-in. pump (A) under cover in foreground which delivers sand pulp to 34-in. cone (B), above. To the left may be seen battery of liquid cyclones, and in the background are the steel storage bins

Liquid Cyclones Recover Fine Sand

• Atlanta Sand and Supply Co., plant at Gaillard, Ga., operates one of the largest installations of liquid cyclones in the sand and gravel industry to produce a clean, graded and blended product

By WALTER B. LENHART

ONE OF THE LARGEST LIQUID CYCLONES for sand recovery is to be found at the plant operated by Atlanta Sand and Supply Co., near Gaillard, Ga. Gaillard is about 100 miles south of Atlanta on the Southern Railroad. The cyclones at Gaillard are of two sizes; both larger than conventional. One is 34-in. and the other 72-in. diameter. They have both been in operation since March, 1950, and may be the first or at least were among the first liquid cyclones to be used in any sand plant east of the Mississippi river. The first data appearing in ROCK PRODUCTS on a liquid cyclone in a sand plant was published in August, 1950, page 108. The unit was in operation in the plant of Caudell and Johnson, San Diego, Calif.

Close-up of liquid cyclones; the higher unit is 6 ft. dia.

South of Atlanta is a strata of sand that strikes from the east to the west across the state extending into neighboring states. At several places along this strata are sand operations. The Gaillard plant of Atlanta Sand and Supply Co., which was one of the first to process this material, has been in operation for 51 years. Due to location and competitive situations in past years, the selling price has been as low as 20 cents per ton so that operations must be simple, of low operating cost, and have a relatively high capacity. The sand at Gaillard is all fine material with about two percent re-

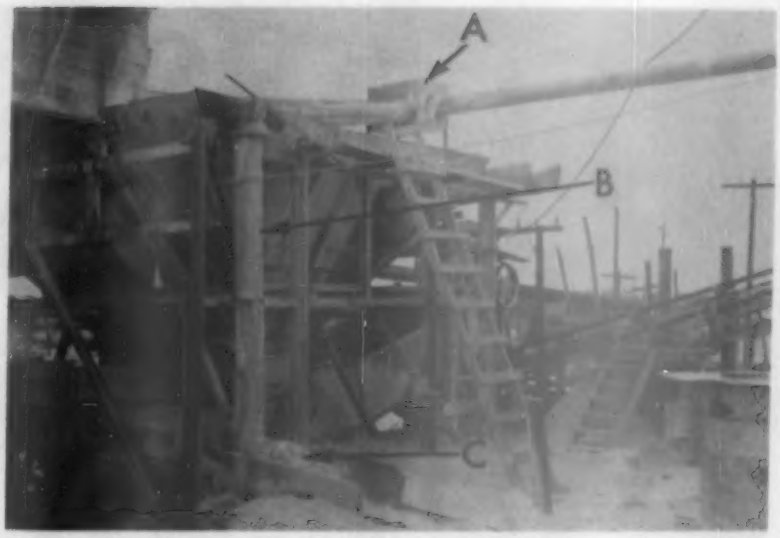
tained on an 8-mesh sieve. It is approximately 99 percent silica and ranges from light yellow to white in color. If the deposit was located in some of the more northerly industrial states, the bank material would undoubtedly be processed for higher grade glass sand and for other industrial uses.

The Atlanta Sand and Supply Co. is owned by M. A. Jamison and operated by his sons, Frank D. Jamison and Pyott B. Jamison with Joe N. Parker as plant superintendent. The offices of the company are in Atlanta, Ga.

Dredges for Excavation

Three 8-in. suction pumps are used to dredge the material, two at one site and one at the other. At the former, one of the dredges is maintained as a spare unit. The bank deposit is mostly above water levels and extends to a height from 40 to 60 ft. Overburden is not important. The general mining technique is to mount a hydraulic "gun" or monitor on the bow of a dredge and wash the bank material down towards the suction head. There is no cutter on the suction line. All pumps are Georgia Iron Works units and the company operates a total of six 8-in. pumps at the Gaillard operation. The two dredge pump set-ups, although within sight of each other, handle different types of sand with emphasis on their differences in fineness. With a backlog of over 50 years of high capacity operations behind them the pit operations are quite extensive so that pumping to the plant is often in the 2000-ft. or more range. Normally an 8-in. booster pump is used about midway between the dredge and the plant. The steel pipeline from the dredge enters the suction side of the booster pump with no surge tank between pumps. A 12-in. steel pipeline with adequate pumps, supply fresh water from other parts of the pit to be used for the monitor.

One of several splitter boxes. At (A) is a vertical handle to control size of outlet leading to pipe (B); at (C) is the final launder to the tailing pond



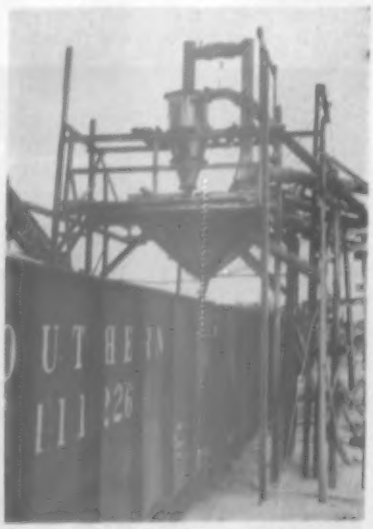
Over the twin sand screws is a 20- x 20-ft. water scalper. Splitter box (A) takes part of returns from 36-in. cone. Pipe (B) returns sand pulp to 34-in. cone along with overflow from the sand screws (C)

Screening Operation

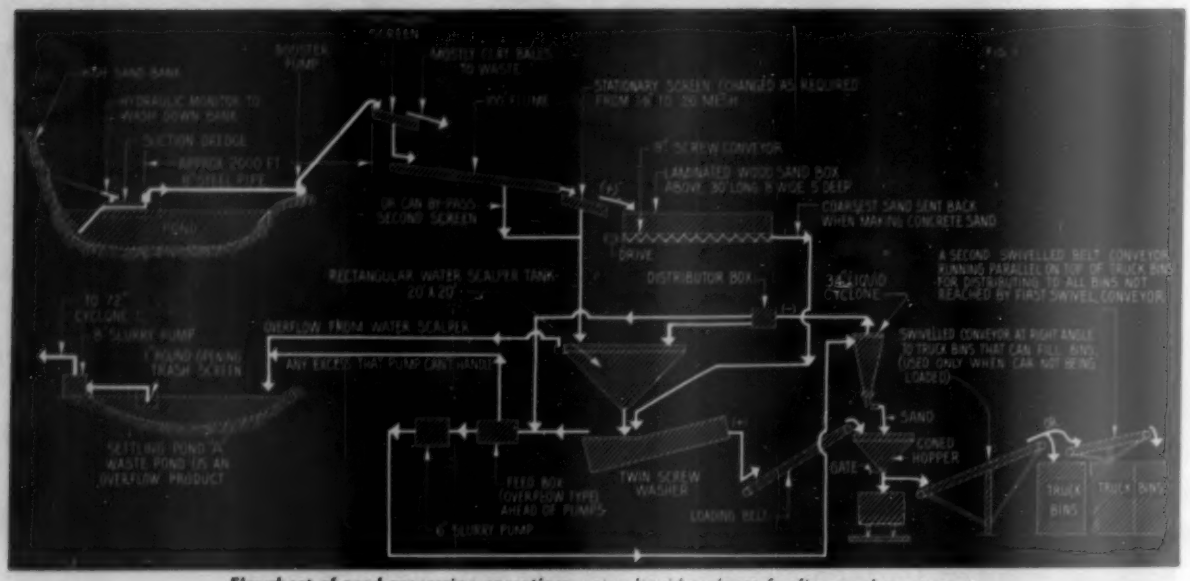
The practice is to pump to the booster which in turn delivers to a stationary trash screen mounted at ground level a few hundred feet from the plant. Plus material is roots and other debris and is wasted. Fines from the screen flow in a launder to a second stationary screen that uses a variable wire mesh, depending on what type of sand is to be shipped, but is nominally in the 8 to 20-mesh range. This screen can be by-passed entirely if desired. Plus from the second screen falls into a long laminated wood box in the bottom of which is a 9-in. diameter screw conveyor. The purpose of this long box is to collect any coarse sand not wanted in some shipments, and to feed it back into the system when concrete sand is being made.

The fines from the second screen and its accompanying large volume of water flow to a large hopper-bottom tank (inverted pyramid shape) mounted over a 36-in. double Eagle sand screw. The tank has a surface area of 20 x 20 ft. and acts as a water scalper. About 2600 g.p.m. are pumped to this tank from the dredge. It has a solids content that is relatively high and normally is about 25 percent. The overflow from this water scalper tank goes to a settling pond that has been designated as settling pond "A" in the flow diagrams. There are three 5-in. diameter outlets in the bottom of this large tank. In front of each outlet is

Frank D. Jamison, manager, to the left, and **Joe Parker,** superintendent



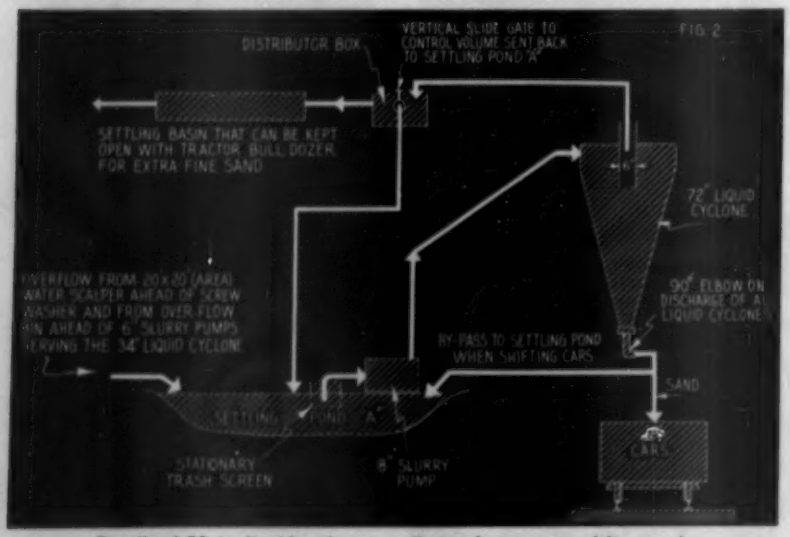
Above railroad freight car is the 34-in. cyclone with hopper below. To the right is the belt conveyor from the sand screw, delivering material to the hopper


SCREEN
BOOSTER PUMP
MONITOR GIANT BALLS TO WASTE
STATIONARY SCREEN CHANGED AS REQUIRED FROM 16 TO 30 MESH
HYDRAULIC MONITOR TO WASH DOWN BANK
SUCTION DREDGE
APPROX 2000 FT. 8" STEEL PIPE
POND
8" SCREW CONVEYOR
LAMINATED WOOD SAND BOX ABOVE 30' LONG 8 WIDE 5 DEEP
OR CAN BY-PASS SECOND SCREEN
COARSEST SAND SENT BACK WHEN MAKING CONCRETE SAND
DRIVE
RECTANGULAR WATER SCALPER TANK 20' X 20'
DISTRIBUTOR BOX
34" LIQUID CYCLONE
A SECOND SWIVELLED BELT CONVEYOR RUNNING PARALLEL ON TOP OF TRUCK BINS FOR DISTRIBUTING TO ALL BINS NOT REACHED BY FIRST SWIVEL CONVEYOR
TO 72" CYCLONE
6" SLURRY PUMP
ROUND OPENING TRASH SCREEN
OVERFLOW FROM WATER SCALPER
ANY EXCESS THAT PUMP CAN'T HANDLE
SWIVELLED CONVEYOR AT RIGHT ANGLE TO TRUCK BINS THAT CAN FILL BINS USED ONLY WHEN CAR NOT BEING LOADED
SAND
CONED HOPPER
SETTLING POND "A" WASTE POND IS AN OVERFLOW PRODUCT
FEED BOX OVERFLOW TYPE AHEAD OF PUMPS
TWIN SCREW WASHER
GATE
TRUCK BINS
TRUCK BINS
6" SLURRY PUMP
LOADING BELT

Flowsheet of sand processing operations, using liquid cyclones for fine sand recovery

an adjustable plate, the plane of which is at right angles to the direction of the pulp flow. The plate can be adjusted to restrict the amount of material coming out of the tank. The sand from the double Eagle sand screw is moved by belt conveyor to the car loading point as there are no car loading bins. However, truck loading bins are available. The belt conveyor from the Eagle screws dumps into a shallow cone that is permanently mounted and straddles the railroad track. The cone is an important feature of the operation for above this shallow cone is mounted the 34-in. diameter liquid cyclone. Sand produced by the cone is two-fold: It permits a blend of the two sands being produced, ahead of the car loading, and is a small storage recepticle that will hold the plant-run while a loaded car is being replaced.

The source of pulp going to the 34-in. liquid cyclone is the overflow from the Eagle twin sand screws. This pulp flows to a box ahead of a 6-in. Georgia Iron Works pump. The pump picks up all the pulp it can handle and delivers it to the 34-in. cyclone and any excess in the head box flows into settling pond "A." The overflow or finer rejects from the 34-in. cyclone flow to a similar distribution box where a split is made; part of the fines return to the 400-sq. ft. area scalper tank, and the remainder returns to the distributor box ahead of the 6-in. pump. Thus, a part of the pulp being pumped to the 34-in. cone is in closed circuit with the cyclone. The coarser sand in the sand box is returned to the Eagle sand screws by the 9-in. diameter screw conveyor when concrete sand is being made.


DISTRIBUTOR BOX
VERTICAL SLIDE GATE TO CONTROL VOLUME SENT BACK TO SETTLING POND "A"
FIG. 2
SETTLING BASIN THAT CAN BE KEPT OPEN WITH TRACTOR BULL DOZER FOR EXTRA FINE SAND
72" LIQUID CYCLONE
OVERFLOW FROM 20 X 20 (AREA) WATER SCALPER AHEAD OF SCREW WASHER AND FROM OVER FLOW BIN AHEAD OF 6" SLURRY PUMPS SERVING THE 34" LIQUID CYCLONE
90° ELBOW ON DISCHARGE OF 72" LIQUID CYCLONE
BY-PASS TO SETTLING POND WHEN SHIFTING CARS
SAND
SETTLING POND "A"
CARS
STATIONARY TRASH SCREEN
8" SLURRY PUMP

Details of 72-in. liquid cyclone installation for recovery of fine sand

The feed to the 34-in. cyclone has the following screen analysis:

Mesh	Percent Passing
16	100
50	80
100	18 to 20

The sand from the 34-in. cone has the following analysis:

Mesh	Percent Passing
100	14 to 16
50	70 to 80

The density of the pulp going to the cyclones appears to be in the 10 to 15 percent range.

Concrete Sand Processing

When concrete sand is being processed, the outlet of the cone is a 3-in. diameter, 90 deg. steel elbow, and when masons sand is being shipped, a 4-in. diameter elbow is used. By the use of an elbow at the discharge of the cone a certain retarding action results that appears to be desirable. There are no valves on the outlet at any time. The capacity of the cone in tons per hour is 25 for the concrete sand and 30 to 35 for masons sand.

The flow diagram for the larger 72-in. diameter cyclone is shown in the sketch. The source of pulp that is pumped to the cyclone is from settling pond "A." This pond is about 60 ft. wide and 100 ft. long, and at the more distant point from where the Eagle screws are mounted is an 8-in. Georgia Iron Works slurry pump that has a closed runner and delivers to the 72-in. cyclone. A stationary trash screen protects the pump receiver from any foreign material. The pump uses a 100-hp. motor and delivers to the 72-in. liquid cyclone. Sand produced by the cone falls directly into

(Continued on page 132)

Direct SALES APPROACH Needed by Agstone Industry

• Companies employing salesmen and agronomists not experiencing downward trend in tonnage. Soil tests will prove a good agricultural limestone sales tool

By BROR NORDBERG

DECLINING USE OF AGRICULTURAL LIMESTONE on the nation's farms has become serious, and presents a difficult challenge to all interested in agriculture and, specifically, to the agricultural limestone industry.

Rarely, has any industry had such a wealth of research data to *prove* the merits of its product and the great need for it. Agricultural scientists have demonstrated the value of liming over many, many years and they have written hundreds of technical articles, pamphlets and books which are undeniable proof that liming is essential to sound agriculture. They show that liming will yield profits, through increased crop yields, that many times exceed the cost of liming.

Agronomists have the facts to prove that a dollar spent for proper liming will return from $5 to $10 or more to the farmer. They estimate a need for 500 million tons of liming material to correct soil deficiencies and they have calculated that 80 million tons would then be required annually to maintain proper mineral balance in the soil.

In the face of these facts, the maximum tonnage of liming materials spread was 30 million in 1947 and the trend has been downward ever since. An estimated 21 million tons was spread in 1953 and the figure was considerably less in 1954. This compares with a current rate of 22 million tons for commercial fertilizers of which an increasing percentage is of the acid-forming variety. The ratio should be from two or three to one, we are told, in favor of liming materials, so that commercial fertilizers will be utilized to full advantage.

Thus, the agricultural liming industry is lacking some 30 or more million tons annually if it was just to keep pace with progress of the fertilizer industry in reaching for the ultimate goal. This one industry, of all the rock products industries, stands out for its failure to make gains.

Tonnage purchased outside the Agricultural Conservation Program has been increased from about one million tons to seven million tons. Percentagewise, the increase is good but that figure represents a small amount of the total and a very small fraction of the need. This increase, however, does reflect recognition of the value of liming by the better farmers, and results of the merchandising efforts of the more progressive producers.

Agricultural limestone is cheaper or as low-priced as it was 25 years ago, but yet, the bulk of the tonnage spread continues to depend upon ACP payments. Sales outside the federal program continue discouragingly low. This condition exists in spite of expanded programs of promotion and merchandising by limestone producers and could well become worse, should farmers be compelled to maintain specified acreage allotments. The need for much more sales promotion and selling effort is clearly indicated.

There are many factors involved in the total problem, with respect to sales under the ACP program and the tonnage sold outside the government program as well.

There is no question of the need for soil conservation including liming. That fact has been recognized for many years or there never would have been federal funds appropriated for the purpose. The amount of such funds available has had its fluctuations but has been ear-marked from the beginning to do a partial job of financing conservation under the Agricultural Stabilization and Conservation Program. Private financing has been expected to complete the job.

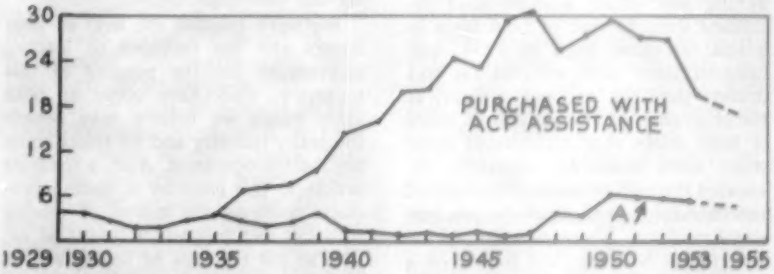
Out-of-pocket purchases by nonparticipating farmers have been the object of attention by the more aggressive producers. Some of the more substantial producers have sought to build this volume of business independently of government aid because they believe in that principle. Others have stressed such sales in anticipation of reductions in total federal funds or increases in the fraction to be paid by the farmer, or in event that such funds may be entirely eliminated. Still others, many of whom came into being because federal funds stimulated a liming program, have continued to depend too much, or entirely, on government financing for their business. The majority of producers rely to a greater or lesser extent on the federal program.

Obviously, it is sound business to produce a good product, sell it on its merits irrespective of government contribution, and give the farmer good service. If a producer be really successful along those lines, he would not be much concerned about the fate of future federal appropriations.

Reasons for Decline

Progress toward this ideal has been painfully slow and for many reasons. Among reasons given are reduced farm income, increased competition for the farmer's dollar by other products, drought conditions of the last three years, and the fact that many farmers have become accustomed to get a dollar's worth of liming materials for fifty cents.

The problem has long been aggravated because of an influx of producers, some with portable operations, and many of whom produce sub-quality materials. Some of them have no aptitude for promoting business on a



Agricultural limestone used in the United States in millions of tons from 1929 to date. Note the curve (A) at the bottom which shows tonnage purchased without ACP assistance

product's merits or have no desire to attempt it. As a result, prices have persisted at far too low a level for a product with so much to justify its use, and little if any margin has been left to sustain the kind of educational promotion and advertising required. Agricultural limestone like any other material in competition for the customers' dollar has got to be sold.

Federal appropriations have been responsible almost entirely for the increase in tonnage of liming materials spread, from a top of some 3 million tons before government aid to the all-time high of 30 million tons in 1947 and they are still responsible for the large bulk of the tonnage. Should the appropriation be drastically cut, the tonnage would decrease almost in direct proportion, and if it should end, the result would be a serious blow.

This fact is clearly understood in official Washington and it is also recognized that stimulation of greater use of liming materials, through federal support, will gradually increase direct purchases as the benefits of liming are more widely experienced. Proponents of maintaining and increasing soil conservation funds have that fact in mind. They also are concerned with maintenance of sustaining fertility in the nation's soils so that our farms can meet heavily increased demands for crops to come. There is no doubt that our increased population will tax the nation's ability to grow food.

The National Agricultural Limestone Institute has taken the position that more agricultural limestone must be spread whether through government financing or direct sale. The association is continuing its legislative efforts toward maintaining adequate federal appropriations for soil conservation and it has, in addition, greatly accelerated its efforts in the field of sales promotion. It is supplying its members with all manner of sales-stimulating aids. As a result, many producers have inaugurated and/or greatly increased selling campaigns. There was an increase in sales personnel and company-hired agronomists of some 10 percent in 1954.

Those who are aggressively promoting and selling agstone have increased their volume of total sales in a few instances, even in 1954, and most of them have suffered far less decline than the national average. If the price structure would permit, there is little doubt that agricultural limestone sales could be materially increased through planned campaigns of merchandising with emphasis on personal contacts. There remains a long way to go, however, and liming, as a soil conservation practice, will require bolstering for years ahead.

Contributing to the decline in tonnage in the last few years has been the return of unspent ACP funds to the government. There was $30 million of unspent funds for fiscal 1953 and the figure was much higher for fiscal 1954.

A survey of county ASC offices in the humid area, conducted by N.A.L.I., determined the causes for the reduced participation. Among reasons given, in order of their frequency, were (1) administrative red tape, (2) the mandatory soil test requirement, (3) declining farm income, (4) "Package" practice requirements and (5) drought and others.

The fact that administrative red tape and the mandatory soil test requirement led the list in contributing to the decline in farmer participation reveals the danger in too much dependence on ACP funds and also their importance to agriculture. Proposals to reduce soil conservation appropriations below the current $250 million level for fiscal 1955 in this Congress and the proposed Holland amendment to the Soil Conservation and Domestic Allotment Act point up the danger. The latter would require farmers to stay within specified acreage allotments in order to be eligible for ACP payments. It is likely that this amendment will be repealed but, were it passed, the result would be a serious drop in sales of agstone under A.C.P.

Appropriations likely will be at about the 1954 level of $250 million for fiscal 1955 and also for 1956 but we wish to emphasize that these appropriations would be made only after overcoming strenuous pressure to reduce them. These recurring attempts to cut funds constitute a dangerous threat to many in the agricultural limestone industry. The uncertainties dictate that producers put more strenuous emphasis on promotion.

In view of the foregoing situation, we attempt herein to appraise the outlook for the agricultural limestone industry, to analyze why a product which will yield so much profit to the farmer is not more widely used, and to summarize business methods of producers who are successfully meeting the challenge.

We have enlisted the help of producers and the thoughts of leading agronomists for the purpose of this summary. They have come up with ideas which we believe may benefit the entire industry and we thank them for their cooperation. Also, a separate article in this issue by a leading producer analyzes the matter of pricing in detail and suggests a course of action to put the idea of liming across.

It is generally agreed by our correspondents — both producers and agronomists — that producers on the whole have lacked esteem for their own product and have not been convinced of its value. They have not realized the need for transmitting the available results of research to the farmers. The majority have, instead, been content to bid a low price on government contracts and have ignored the main potential market, now outside the ACP program, which requires sales effort to develop.

By contrast, fertilizer manufacturers have been vigorously selling their products and have seen to it that their selling prices are such that adequate sales efforts direct to the farmer may be undertaken. The figures for fertilizer sales compared to those for agstone indicate that fertilizers actually are being over-sold, in the sense that agstone application must keep at a higher pace in order for the farmer to get best efficiency from the more expensive fertilizers.

Should fertilizer sales continue up and limestone sales not keep pace, the farmer will be further penalized, particularly as the trend continues toward the use of more acid-forming fertilizers. Use of anhydrous ammonia, ammonium nitrate, sulphate of ammonia and other nitrogen-type solutions has gained sharply in recent years and this trend alone should require a large tonnage of agstone purely for neutralization.

The idea that it costs too much to conduct adequate merchandising has seriously jeopardized the cause of agstone and has been largely responsible for the industry not getting its share of the fertilizer dollar. Fertilizer manufacturers have proved that farmers have the money to buy what they think they need. They need liming materials first of all and they should expect to pay enough for them to build a respectable and stable agricultural limestone industry. Then they could be privileged to select the material they prefer, and expect and get efficient service.

Irresponsible competitors have failed to go along on this and have refused to do more than haul the material and let the government underwrite the cost. Those who produce a "by-product" agstone have been guilty of not making proper charges per ton in establishing their prices, to the detriment of all. Farmers as a result have not been convinced that liming is essential to fertilizer efficiency, that large profits are available through liming, that they must be patient because limestone has relatively slow solubility, etc. Probably 90 percent of all the agstone sold is to one-quarter of the farmers.

A summary of producer comments

SICK SOIL-
SICK CROPS PRODUCE POOR UNHEALTHY LIVESTOCK
HAVE YOUR SOIL TESTED!
EAST ST. LOUIS STONE COMPANY
Phone: Upton 4-7310
E. St. Louis, Illinois
LIMESTONE IS A BARGAIN
A dollar spent for Agricultural Limestone is a good investment.
for example
BOUGHT
$$$$
BUY 30% LESS LABOR AND 15% LESS FARM EQUIPMENT TODAY THAN IN 1940.

Samples of some "eye catching" advertising by producers with copy furnished by N.A.L.I.

on business conditions, prices and handicaps to doing business indicates that failure to get the story of liming over to farmers, rather than economic factors, has contributed to the low volume of tonnage spread. Several long established producers who had successfully merchandised agstone for many years before the government program now say they must give their product away. It is indicated that such companies are possibly retrenching in their promotion.

The majority of those who sent in comments are companies which are merchandisers and it is significant that some of them actually had increased volume in 1954 in the face of a sharp national decline. Nearly all others have suffered far less decline than the national average. This, they attribute, to their merchandising effort, stress on service and quality. Many have indicated that merchandising is to be expanded and that emphasis is to be shifted to more direct sales. Personal contacts through salesmen and company agronomists seem to be most productive in building sales and there will be much more such effort. These producers expect to capitalize on their recently increased promotional effort in 1955.

It is surprising the effect of the 3-year drought in the principal agricultural states. Those who have experienced good precipitation this winter in their areas expect much improved business. Portable plant operations have depressed prices particularly in Iowa and the outlook is not considered good in that area.

Some report that older customers are using more limestone while others say that they are using less tonnage now that they are realizing benefits from liming. A good number report they are adding new customers, and these companies are relying heavily on direct sales contacts.

High freight rates are handicapping rail shippers and opening the door to portable plant competition. Soil tests are proving a powerful sales tool particularly for companies having agronomists and those providing a complete fertilizing service. Advertising of all forms is on the upgrade and is contributing to more effective use of sales personnel.

Some of the large shippers by rail and truck are encouraging their dealers to establish stockpiles in their principal market areas as a means to provide timely service. Truck haulers from such plants are urged to use larger trailer units to build such stockpiles, in order to cut costs.

Prices for some 80 percent of producers remained unchanged in 1954 and, for most of the balance, they have been reduced. The level of prices has not been a cause for the drop in tonnage. Whereas the temptation has been to reduce prices, for some companies, to meet competition and hold volume they have maintained prices and put the difference into advertising. In one state, the producers have agreed to earmark a flat five cents per ton over and above normal expenditures in order to finance advertising.

Most producers do not sell fertilizers as such but do work closely with fertilizer interests in recommendations and, sometimes, in providing spreading facilities for fertilizers. Those who sell fertilizers have been successful in increasing agstone sales substantially. A few companies have a complete crop service even to handling crop sprays and other products for the convenience of the farmer. One Missouri producer handles a full line of fertilizers and has worked out a complete program of financing over a 3-year period.

Government restrictions and changes, and the mandatory soil test where in force, are the principal business handicaps. Delays due to soil testing requirements were serious in 1954 as were administrative delays at the county level. Farmers resent crop restrictions on wheat and corn and they object to outright demands that their soils be tested. Competition from automobiles, freezers, TV sets, etc., all of which are available on easy credit, is being felt.

Business Condition Reports

Among typical comments on business conditions were the following:

OHIO: "We discussed a slight reduction of prices both from our stand-

point and from the standpoint of our truckers at our recent meeting, but decided that rather than reduce prices we would put a little more into advertising effort. Some conditions at this time are not conducive to increases in prices, but I do feel that if we spend a little more in advertising effort that we may get a better share of the farmer's dollar.

"We do not handle fertilizer, but we do work very closely with the fertilizer interests and in fact through our own testing service we sell a lot of fertilizer which is, in our area, handled and spread mostly by our limestone dealers who have bulk spreading service.

"Our handicap for 1955 will, of course, first of all be the corn acreage allotment if it should continue as it is now written, and of course the farmer is being pretty much squeezed with prices of farm commodities."

VIRGINIA: "Since 1947 our volume of agricultural limestone and kindred products has more than doubled. In fact, our shipments during the agricultural season which runs through about eight months of each year has always absorbed practically all the products we could produce. Therefore, our volume has depended largely on our facilities for producing which we have more than doubled in the past seven years.

"The increase has been due largely to the fact that we furnish a high grade product chemically and endeavor to give good service on shipments."

ILLINOIS: "Our volume of business has not declined during the last year, but in fact increased. This increase was due, we believe, to a more intensive cultivation of our dealer organization, a greater use of advertising matter, and a larger distribution of bulletins prepared by the State of Illinois Agricultural Department for the Midwest Association. No new dealers were added last year, so we feel our program was beneficial when we review the results. Our principal market is located in central Illinois, and the farming communities in this area were seriously affected by drought conditions during 1954.

"We have every expectation of maintaining our 1954 volume through 1955, and perhaps increase it somewhat. This forecast, naturally, depends on many factors, including moisture, farm incomes, etc. Because of the location of our plants we have a freight cost problem that more or less confines our activities to a somewhat limited area."

MICHIGAN: "Our company is located in an area that is not lime deficient. Our market is in a range of 40 to 160 miles from our plant which makes it mandatory that we sell entirely through dealers or lime distributors.

"Our volume of business was down slightly in 1954 from the national trend. We attribute this to a poor dealer or distributor relationship. A number of the dealers continue to haul material from our plant to distances of 40 to 60 and as high as 80 miles in small trucks handling approximately eight tons per load. This is not profitable and we have been encouraging them to transport the material in large truck-trailer units dumping in a central location, reloading it into their eight-ton units and spreading on short hauls. This would obviously speed up delivery to the local farmers and could be done on an overall smaller cost to the dealer. Other dealers who are taking it by rail are being encouraged to locate several sites in their own distributing area where they can receive by rail and deliver from those on shorter hauls to the farmer which would be more advantageous to the distributor. In Michigan we formed the Michigan Agricultural Lime Producers Association a year ago which is working closely in conjunction with the Michigan State College. One of the major items being done in this Association is the sponsoring of a student at the Michigan State College. He is farming test spots throughout the state and keeping the results on these, which will be used by the Soil Science Department of the Michigan State College both on the radio and in their advertising literature.

"We see no principal handicaps in 1955; however, we are plagued with the perennial problem of under-financed dealers or lime distributors who find themselves unable to pay for the material they purchase. It is necessary for us to work very closely with them and almost directly handle their personal financial problem in order to keep them on a sound basis."

PENNSYLVANIA: "We have not experienced a decline. On the contrary, our pulverized limestone business increased 11 percent in 1954 over the 1953 figure.

"We feel that our increase has been due to several factors, the most important being: 1. We had one of our two field representatives pull soil samples for the farmers who signed up but never got around to getting a soil test into the proper agency. 2. We insist on our truckers having good equipment and handling it to the best advantage. In case of a bad spreading job (which is decided by our field men) the trucker is asked to spread what it takes to make an adjustment without cost. The result has been that we have not had one pulverized limestone spreading complaint during 1954. 3. We give a free, complete soil test to anyone who requests it without obligation to buy under the program or outright. 4. We send a bi-monthly news letter to about 3000 customers and prospective customers. 5. We sponsored the first land judging contest in Pennsylvania and provided a free trip for the top four boys to the Land Use and Management Contest in Illinois. 6. We have had exhibits at several local fairs and agricultural shows. 7. Close contact and cooperation is maintained with the vocational agricultural teachers, county agents, soil conservation personnel, and ASC personnel. 8. Service is our bread and butter, therefore we put it before eating and a lot of other things.

"Business for 1955 looks good. As a result of the ASC regulations last year fewer farmers received larger tonnages under the program. We picked up an encouraging number of new customers. As far as old customers are concerned, if they are in the market for a liming material, we usually get their business because of the reputation the material has made for itself through the result it gives."

TENNESSEE: "We are primarily rail shippers supplying areas of several states. Over the past ten years, our volume of business has been much in line with national consumption, although we have experienced a small increase in some areas over the past two or three years. We feel increased sales contact and promotional work in the territories and, of real significance, closer cooperation between industry, extension folks, ASC folks and other farm agencies has had much to do with holding or increasing volume in the face of the restrictive measures written into the conservation program."

OHIO: "Our sales were about 12 percent less than in 1953. If the weather in the latter part of the season had been more favorable, this would perhaps have been reduced to about 6 percent. Old customers are not using more tonnage because of their good experience. The price of milk has been considerably lower this past year, resulting in farmers not having the money to spend.

"I think the principal handicap in 1955 will be the eliminating of farmers who over-planted their wheat acreage allotment, and because of this are not eligible for payments on the ASC program. If this is changed I think the 1955 business will be about the same as in 1953. Again in our territory the price of milk will have its effect."

TENNESSEE: "Our sales during the year 1954 were quite a bit better than in 1953, and look still better for the year 1955. Our old customers are using more limestone and we are also

adding many new ones, which pleases us.

"It is just a little early to predict what our handicaps will be for the year 1955. I would say that the weather will be a limiting factor, and that is something over which we have little control. Our distribution being in the south Middle West, we have been plagued by drought for three years. This continued drought has cut the farmer's money short, also, soil building materials have failed to give the real pleasing results that they are capable of giving."

INDIANA: "Volume of aglime sales has declined to some extent, but not as much as we feel it would have, had we not spent more on promotion. Prime handicaps in addition to reduced farm income are (1) ACP allotment requirements and (2) mandatory soil tests. Farmers seem to resent both and some feel that it is economically unsound for them to reduce certain crop production to qualify for ACP assistance. This is particularly true of beef farmers."

INDIANA: "We sell fertilizers of all kinds, and have a conventional fertilizer spreader. That increases the tonnage very consistently."

MISSOURI: "Our volume has held up compared with the national trend. However, we feel sure that had we not endured three years of severe drought our demand would have exceeded the trend of the national consumption.

"Our business in 1954 was 20 percent lower than in 1953. If we have good moisture we feel that our business will begin to increase.

"As far as the ACP program is concerned, we feel sure that if they will cooperate a little more by not having so much red tape, conditions will improve for the farmer and our industry."

IOWA: "Our volume of agricultural limestone sales has been reduced. Trainload business covering an area of about 100 to 150 miles in each direction has been cut to not a carload since the government subsidies went into effect or a loss of about 30,000 tons a year. There is nothing we can do about it because of portable plants and excessive freight rates.

"The mandatory soil test had its effect but to no appreciable amount. While we work very closely with the farm and ACP officials and contact every prospect by mail the tonnage naturally keeps dropping. You can't give any segment of our economy something for nothing and expect them to buy unless the give-away method continues and our immediate area was pretty well limed through our own sales and promotional efforts over a period of, say, 30 years.

Typical of some of the smaller capacity agricultural limestone plants is the Wilcox Quarries at Princeton, Mo.

"Our tonnage has steadily decreased and will continue to do so as long as portable plants open up quarries within two to five miles from our quarry. They bid and get the county road surfacing jobs and sell the resulting agstone at any price they can get for it from local truckers."

ILLINOIS: "Compared to the trend in national consumption, I believe that our volume of business, as well as other producers in our area, has fairly well followed the downward trend. The main reason for this trend in the southern and central Illinois area seems to be that of drought conditions which have existed for the past three summers. I do not believe that consumption in this area will increase appreciably until a good crop is harvested. In view of the increased rainfall the past four months compared to the same months in the past three years, the outlook is hopeful for this year. Prices have been maintained through this drought period as we have not considered the price of material to be the cause of reduced sales."

TENNESSEE: "Our volume of business in 1954 was slightly more than in 1953, but both of these years were considerably under the three previous years. We find that old customers, who know the value of agstone continue to use it; and our need is to secure new customers.

"The price was lowered both by our company and the truckers in 1953 and this price is still in effect, as we felt a slight decrease would make the farmer feel that we were trying to pass on a decrease in his costs, since he had had a decline in the market value of his products.

"As to 1955, we have a feeling that the limestone business is going to be better by a good deal over the years 1953 and 1954, due to the fact that some of the regulations have been changed and there is not as much red tape to the farm program. Also, through this area we have had three years of very bad drought but during this winter we have had plenty of rain and the soil should be ready for an abundant crop by Spring."

Promotion

One of the nation's leading agronomists has expressed the problem of building sales volume by attributing the falling sales to a poor appreciation of the value of liming on the part of the farmer and inefficient teaching of him. The result has been that the farmer has turned to paying for starter fertilizers and has excluded the sustaining fertility in agricultural limestone in attempts to get high production quickly. This agronomist has further suggested that the decline may indicate that mining of the soil by certain fertilizer elements is not resulting in crop boosts so that the farmer can buy more fertility.

There is little question that farmers must learn to operate more efficiently in order to survive cost and price pressures and that he must be taught which types of nutrients, and how much of them, will yield high level production. For that reason, agronomists hold that promotion of the idea of profits is a powerful sales tool for agstone. They maintain that farmers have not been made aware of agstone's importance in increasing yields. The fact that returns are slower than from fertilizers is a factor.

More aggressive selling by fertilizer companies has turned the farmer's attention away from liming materials even though he has not yet caught up with liming as the first essential to good farming. Fertilizers are being emphasized in the colleges and by frequent articles in farm magazines. Some of these articles, say the agronomists, are designed to sell fertilizers and at times are unsupported by accurate facts.

Contributing factors in the decline are that many farmers grow fairly good crops on acid soils and they are

satisfied, not knowing how they might improve their yields. Salesmen, according to some agronomists, are passing up potential users who have not seen evidence of benefits from liming and who therefore would be most difficult to sell. Many of them are too inaccessible to be supplied technical data from regular sources and must be approached by direct contact.

The distributor and trucker should be made more sales-minded, as an economical approach, and the agronomists believe there is a need for more of the old-time demonstrations to remind farmers of what may be accomplished.

The need, they say, is for a promotional campaign to be conducted along the lines of successful programs in other businesses, with stress on how the product benefits the farmer. It would include local and national advertising as well as dealer sales propaganda. Closer cooperation with the Experiment Stations, Extension Services of the Land-Grant Colleges, the Agricultural Stabilization Conservation Program, fertilizer manufacturers, distributors and others concerned, as one big integrated effort, is advocated. This relationship is being promoted actively by a few producers at the local committee level and such group action, it seems, would be desirable in every state.

Producers' letters indicate that the selling effort is now being intensified and results indicate that if a large majority would follow their lead that agricultural limestone could be built into a stable business. Direct sales contacts are most effective whether in direct farmer calls or in working with dealers. A great deal of leaflets and literature are being put to use. Practice is to supply dealers and have them present them to the farmers. Much of the literature so used is prepared by N.A.L.I.

Direct mail is proving very effective and a considerable number of producers are conducting radio advertising and running space regularly in weekly farm papers. One company has completely revised its program to comprise personal calls, a soil sample service, the collection of samples and the plotting of farmers' acreages.

Merchandising Practices

Among some of the comments on the subject of merchandising were the following:

OHIO: "We are in the process of trying to increase our promotional efforts. We are continuing with our direct mail in which we are, this year, including return postal cards for people who want soil tests made or would like a representative to call upon them. These, of course, will be followed up either by our own personnel or by our truck dealers. We are also entering into some cooperative newspaper and radio advertising going along with our dealers. However, we cannot report results on this added effort to date."

VIRGINIA: "We have, to some extent, increased our promotional efforts and my opinion is that personal work among the dealers as well as the farmers and some advertising have provided the best services in increasing sales."

MIDWEST: "Our sales are all through dealers. We have however, furnished advertising folders produced by the N.A.L.I. for the distributors to mail in their area. More recently we have the promise of one county ASC committee to include these folders in their regular mailing list in their own county. This folder will have our own return address stamped upon it.

"Our volume of business was off approximately 15 percent in 1954 compared with 1953. At the present time we have a great deal of dealer interest in the purchase of limestone for 1955 and I look at 1955 with a fairly optimistic viewpoint."

PENNSYLVANIA: "Recently we began a three-times-a-week 15-min. radio program over a local station. We have a free soil testing service and publish a news letter called the "Soilbuilder." We find that personal contact by our field representatives to be the most effective form of promotion."

TENNESSEE: "Over the years, we have kept salesmen in the field doing close contact work, and as a result a very substantial percentage of our products move to farmers outside, or in addition to, that moving under assistance allowed under the ASC.

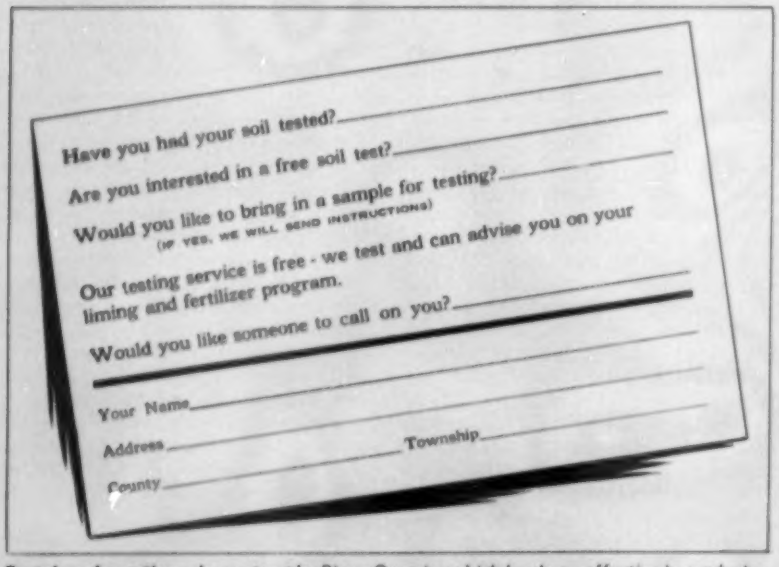
"Throughout our sales areas, we make heavy distribution of not only our own sales material, but also a number of the promotional pieces developed by N.A.L.I. Also, we have made wide distribution of the booklet entitled "100 Questions and Answers on Liming Land," obtained from the National Lime Association, which we have found to be very effective."

VIRGINIA: "We have completely revised our promotional efforts by additional personal calls, and a soil sampling service. The state laboratory conducts tests and county agents recommend that we collect the samples and plot the farmer's acreage.

"We accommodate the farmers on their fertilizer requirements. We do not exert too much effort along this line."

SOUTHEAST: "We have increased our promotional efforts. Personal calls prove the most effective. Personal calls allow the privilege of talking over mutual problems and coming to an immediate decision.

"Looking at the agricultural limestone picture from an overall point of view, it is essential that we must not let up in our efforts to increase our farmers' education, which should come from the universities and the Extension people, for they are the best qualified to do this teaching. The bank people must also be included in this group, for it is extremely important that they know the full story, thereby permitting them to finance the farmer over a period of years. The final result will be prosperity for all and the stamping out of hidden hunger, the thing we fail to see, which knifes us


Have you had your soil tested?

Are you interested in a free soil test?

Would you like to bring in a sample for testing?
(IF YES, WE WILL SEND INSTRUCTIONS)

Our testing service is free - we test and can advise you on your liming and fertilizer program.

Would you like someone to call on you?

Your Name

Address

Township

County

Postal card questionnaire sent out by Piqua Quarries which has been effective in producing inquiries and sales of agricultural limestone

in the back and takes so many lives each year, just because we can't get wholesome, nutritious food.

"With all the respect in the world for the ASC folks, because they have been doing a wonderful job in spite of their handicaps, and certainly they should be congratulated; but wouldn't it also be fine if it were possible to form some sort of a financial organization similar to the G.M.A.C. or C.I.T. organizations, for limestone alone, limestone being a four to seven year investment? As we all know, there would be few automobiles sold if the customers were required to pay cash on delivery. This is just a thought, but it could be the key that would unlock the door to this great field of endeavor."

MARYLAND: "If we had to pick any one promotional effort responsible for our slight increase in 1954, it would be due to more personal calls, with the help of a one-page leaflet entitled "Lime Your Pasture," issued by the National Agricultural Limestone Institute. We also found that in schools, with 4-H students, a booklet "What About Agricultural Limestone," has done a remarkable job. This booklet was also published by N.A.L.I."

INDIANA: "We have increased our advertising in the form of local newspapers, 'mailers' such as furnished through N.A.L.I., and displays at county fairs. In addition, we have just recently employed a full-time sales engineer to make additional personal contacts. Most of our sales are to truckers, who do most of their selling through personal contacts. We are furnishing them the services of this sales engineer at no charge to them."

INDIANA: "We are mailing more literature, using the individuals' personal name; also radio script, daily six times each week."

MISSOURI: "We have a full-time salesman who helps the farmer secure soil tests and we feel sure this type of promotion has helped us.

"We sell a complete line of fertilizers and work very closely with fertilizer interests. We have a complete financing program which extends over a period of three years for the farmers so that a deserving farmer need not go without necessary soil nutrients."

ILLINOIS: "Our company has increased newspaper advertising and greatly increased the number of personal calls. There is no doubt that the personal calls are the most effective."

TENNESSEE: "We now have a radio program through our local station giving news three times each Sunday. Our radio officials felt that we could reach the farmers better on Sunday than any other day, and we have these

Quarry and crushing plant near Perry, Kan., which produces both agricultural limestone and road surfacing aggregate

15-minute programs at 7:30 a.m., 9:30 a.m., and 5:00 p.m. In addition, we have asked our salesman to contact the leading farmers in our trade area, since it was brought out at the National Agricultural Limestone Institute's convention that if the top 10 percent of the farmers were contacted personally and sold in the idea of agricultural limestone, the other farmers would no doubt follow the example of these leaders. We will possibly also do some direct mail advertising."

Soil Tests

The mandatory soil test as put in force by some states in 1954 along with attendant red tape had much to do with the sharp drop in sales of liming materials to farmers participating in the ACP program. This requirement was set up as prerequisite to eligibility of farmers to receive federal funds and has served to stifle local judgment in some areas. One result has been an accumulation of delays in getting and mailing the samples, testing with inadequate facilities and giving clearances. These delays have antagonized farmers. Farmers in many cases just have not relished having their methods changed overnight without adequate data to support the reasons.

One fault in the test is that it cannot be depended upon as an absolute test for liming needs, and efforts are being made to do that. There are great variations in the interpretation of pH tests by areas. In some instances, acidity correction is the main thing sought while in other areas tests are desired as necessary to determine calcium and magnesium requirements as well as the amounts of other nutrients. There are cases where previous treatment of soil, crops already grown and those to be raised are considerations.

The result has been a very confusing experience. At the same pH, there are instances where no liming was recommended and others where application of 4 or 5 tons was recommended. Recent experiments which show optimum yields at pH levels far higher than neutral have been discarded, because of a pH reading of 6.5 which was interpreted as meaning that no lime was needed. Authorities just have not agreed on the interpretation of test readings. The tendency is to specify liming on a minimum basis.

Many farmers have been cut out from the program as a result and the "better" ones have been getting a greater amount of assistance under the program. Thus commercial sales outside the ACP program have been reduced.

Producers have no quarrel with soil tests as such if they be properly taken and interpreted, and if adequate facilities be made available for sampling and testing. If the red tape and delay be eliminated, which most expect to happen, opinion is that the soil tests will have great beneficial value and contribute to future sales. It is recognized that some yardstick is desirable. The mandatory requirement is in effect now in certain states only and is not enforced yet in others until facilities become available and experience is gained.

Agronomists believe that universal testing can contribute a great deal to the industry and better farming, and that tests when properly used will promote more effective use of liming and benefits. Excess application, they point out, will lose customers. The farmer can really be made to believe he needs liming material when tests so indicate and are supported by technical facts. Testing, they point out, will have greatest value in developing new customers from the poorer farmers.

Effect of Mandatory Tests

Typical producer comments were as follows:

OHIO: "The mandatory test is not actually in effect in this state and the farmer could either lime on a state test requirement or, by stating that he could not grow alfalfa, he could use two tons per acre. I believe that the

(Continued on page 166)

AGSTONE Prices
Should Be High Enough to Do A Good Selling Job

By JOHN M. DEELY*

John M. Deely

IN ATTEMPTING TO APPRAISE agricultural limestone merchandising on a nation-wide basis, it becomes a matter of great importance to take into consideration the vastly different specifications in various state areas involved in the production and sale of the product itself. This varies, from the requirements in the Northeast, which calls for the production of a comparatively finely ground limestone, of a specification of approximately 100 percent passing a 20 mesh screen, to the standard in some Mid-Western and Southern states, where the specification permits the application of limestone of very considerable coarseness. This fact alone sets up a great price variation from one area to another.

One must also realize that some quarries are engaged solely in the production of agricultural limestone; that others (and they are the vast majority) produce agricultural limestone to a greater or lesser extent as a by-product of a road stone or burned lime operation.

It therefore becomes perfectly clear that individuals or companies, when confronted with the specific marketing situation as it relates to their individual plants, do view their problem from seemingly irreconcilable points of view. On the one hand, there is the producer who relies solely for his living on the sale of 100 percent of his product to the farmer, and yet he is operating in an area where another producer is merely looking for the sale of a by-product material which represents to him only a nuisance value or even an item of substantial cost in its mere disposal.

Because of these unusual production conditions, there has been a great variance in the selling price of these limestone products, with a resultant country-wide low average return or actual loss to the producer on his capital investment as it relates solely to agricultural limestone sales. *If the proper factors of cost and overhead* were assessed against all limestone supplied to agriculture, instead of being absorbed by other products, these economic factors would become very clear.

Present Prices — A Subsidy

I believe it is a true statement that, when viewed in this light, the agricultural limestone industry itself, country wide, has been subsidizing agriculture to the extent of many millions of dollars per year if proper accounting practices were assessed against each ton manufactured and sold.

Why should this condition exist and will something be done about it? My answer is in the affirmative, because of the start in the development of research, promotion and proper sales effort.

The agronomists of this country have established beyond any doubt the economic necessity for the need of our soils for 80 to 100 million tons of limestone per year, if we are to continue to maintain in our soil the mineral balance necessary for the welfare of the people of our country. This fact is inescapable and each year these very same scientists are continuing to find added need for the elements of calcium and magnesium which can most economically be supplied by lime and limestone alone.

The Congress of the United States and the soil specialists in the Department of Agriculture are continuously more and more aware of the need for proper soil balance and the conservation of our soils and have expressed this need in the terms of legislation and appropriations. They have made a partial financial contribution designed to reverse the dangerous trend of soil depletion by giving the farmers under the Agricultural Stabilization and Conservation program the chance to prove to themselves that the return of proper mineral supplements to the soil is in the interest of the consuming public and the economic advancement of the farmer himself. However, this appropriation satisfies only 15 percent to 20 percent of the proven need.

An observer must therefore properly raise the question that if all of this is true, why has not the case been proven by now, and why have not the sales of agricultural limestone expanded in the face of an unchallenged need? It is the opinion of many that the limestone industry itself must bear a considerable basic responsibility for the failure to substantially increase the private sale of limestone.

It is not my intention to claim that progress has not been made nor has the writer any doubt but that the pace of this progress will be accelerated. However, let's face the facts. A few years ago many producers of limestone, particularly in the by-product field, lacked proper esteem of the value of their own product. Primarily they were not really convinced of the value of this tremendous potential, the advantage to and the dire need of American agriculture for the limestone that existed in those very waste piles which they were eager to get rid of at almost any price. They did not realize that they had a basic responsibility to pursue certain essential steps, in order to make their product available to the farmer. They did not realize the length of time involved and personnel needed to transmit this research information to the millions of farmers who wanted and needed the facts about their product.

Producers were content to bid a low price on government contracts and let it go at that. They simply ignored the other 75 percent of the market. They failed to realize that the agricultural limestone business required the adoption of the same methods of sale and promotion that they assiduously gave to their other business with the resultant responsibilities for making available to the user in their own individual marketing area the technical knowledge and advice and assistance which is an integral part of sound American business practice. It is true that they formed and to

*Immediate past president N.A.L.I., and president, Lee Lime Corp., Lee, Mass.

a substantial extent joined their trade association — The National Agricultural Limestone Institute. It is true that this association has made remarkable progress at the level at which a successful association should operate. It is true that they provided funds at the national level to continue proper educational efforts through the Washington office with a capable staff and splendid industry committees. It is a fact that their national association has been effective in the field of research, in the field of the development and dissemination of effective literature and in the area of effective liaison with the individual member companies.

It is equally a fact that many producers have joined with others in the formation of state groups, whose function is more localized and is able to effectively translate in state or regional areas the information received from the national organization and from the efforts of their own state staff. Many of these groups have performed admirably, and their success has been proportionate to the interests and participation of the individual member companies.

Need More Action At Local Level

It is in the localized field that I believe that there should be a great intensification of joint national and state activity, and it is here that I feel real progress can be made. In each state are many splendid groups devoted to the interest of the farmer. These groups are manned with personnel who operate not only at the national and state level but who have, in addition, their counterparts at the county level in every section in this country. Of course I refer to the Agricultural Stabilization and Conservation State Committees and administrative staffs, the State Extension Committees and their technical staffs, the Soil Conservation Committees and the staff. Also at the state level are the outstanding state universities, with their fine agricultural experts, research agronomists, aided by the prestige of the state universities themselves.

As an evidence of what can be done, I personally attended a meeting in the State of Massachusetts which brought together the producers of limestone and their salesmen and many representatives of their dealers and cooperatives to an all-day meeting, called by the head of the Department of Agriculture of the State University. He had been invited to attend and had the active participation and representation of each of the above mentioned groups, Agricultural Stabilization and Conservation, Extension, Soil Conservation and the interested college department heads. There were present, in addition, many of the county men who are the close tie and the disseminators of information to the farmers themselves. Papers were prepared and read outlining the research results and recommendations of these men, as to the soil needs for lime in the State of Massachusetts.

A representative of the limestone producers presented a paper to outline to the federal and state men the many problems of the industry. He pointed out the desire of the producers to work in close cooperation with the representatives of all agencies in presenting to the farmer the true picture of lime needs. Practical, down-to-earth questions were raised by all dealing with marketing and research investigations. Seed people told the story of new types of alfalfa and other legumes, in relation to lime needs. A representative of a cooperative told the story of a special alfalfa seed which had been developed, of which only a few hundred pounds were available. He told of the intensive soil preparation and fertilization of the test plots to develop the beds for more seed. He told of his despair when it was discovered that on one field the crop was a failure and the only cause was the lack of adequate liming.

Everyone representing the manufacturer, salesman, professional staff and the county extension service, soil conservation, and agricultural conservation came away from that meeting enthused because each one had appreciated the broad total overall problem, as presented by each individual group. They were better equipped to help the farmer because they themselves knew more of the total problems and needs.

This sort of group action should, in my opinion, be spread through every state in which there is need for lime. In many of the larger limestone consuming agricultural states such meetings should be held in individual counties or in groups of counties. Why? Not just because it will sell more lime. Far more important because it will cut the cost of production for the individual farmer who very seriously needs this help and this knowledge and needs it now.

What is the responsibility of the individual producer as it relates to this opportunity to treble his business and I ask — *Where are the Peddlers?* Why doesn't the average producer of agricultural limestone set up a selling organization commensurate with his needs and with his opportunity? Ask many and they will invariably tell you that it costs too much money to merchandise limestone on a farm-to-farm basis, or to train dealers' organizations qualified to do it. He will invariably report that his competitor, who makes a by-product, sells the limestone at a price which would not stand a 10 percent selling cost. Therefore, what happens? Much of the fine information and much of the technical knowledge never does get into the hands of the very person for whom it is intended and to whom it is of value. The seller has not found the buyer and properly presented the outstanding case which can be made for limestone.

There is real competition for the farmer's dollar by people who are spending money on their sales — the tractor salesman, the fertilizer salesman really go all out and spend sales dollars and grow great from their sales efforts at the farm level. The producer of limestone should ask himself, "Have I added enough to my price costs to justify the cost of active sales efforts at the consumer level?"

The producer of by-product material should ask himself, "Have I made proper charges per ton to my prime cost for overhead and administration and have I priced my product so that there are funds available plus sufficient manpower to bring to the farmer the knowledge that for every dollar invested in lime he will get a return of $6 or $7?" Competitive salesmen in other fields cannot give this assurance to the farmer. Their case is not as good. Yet they get the farmer's dollar.

Has any producer of limestone the right to expect that the agricultural specialists and county agents should sell his limestone for him for free when he hasn't confidence enough in his own product to be willing to add proper sales costs to put over his own message. I include the training and education of salesmen, the development and utilization of literature and other proper sales and advertising media designed to prove to the farmer that his best investment is in lime and above all provide man power to take this message personally from farm to farm, either by their own men or through their established dealers.

Are limestone producers doing their utmost to so improve the quality of their product that each year they try to give to the farmer the best possible buy for his money invested? Should not each producer of limestone check in his own state or marketing area and realize that if the total tonnage of liming materials sold is not two or three times the total fertilizer tonnage sold in a particular area that the farmers of his state are not making the best buy for their dollar invested? Do not limestone producers realize that

(Continued on page 96)

AGRONOMIST Views On Stimulating Agstone Sales

• Agronomists point to proven facts which should comprise educational selling of agricultural limestone

SOME OF THE NATION'S OUTSTANDING AGRONOMISTS were asked to present their point of view on what ails the agricultural limestone industry, and to suggest a course of action to retard the downward trend in agricultural limestone sales.

Many of their ideas have been incorporated into the main article on the general subject in this issue. Others have written special articles which are published under separate by-lines. Comments from the more informative letters received are as follows:

New Jersey

"It is the simple fact that a distressingly large percentage of our farmers are not farming as well as they could.

"This is particularly well illustrated in the case of the agricultural use of lime for soil improvement. Certainly no single material or practice has been as extensively and intensively studied as liming. There is no dearth of well documented evidence of its many beneficial effects. I doubt if any single practice has been discussed, explained and recommended more often by soil scientists, agronomists, conservationists, extension specialists, county agents, vocational agricultural teachers, etc. Yet the fact remains that agricultural production on as much as 50 percent of our farm land is limited to some degree by insufficient or improper use of lime. The reason is not that available liming materials have failed to do all that was expected of them, nor does their cost exceed their benefits, nor are there many farms beyond the reach of distribution services.

"The liming situation in New Jersey is summarized by Dr. E. R. Purvis as follows:

" 'In my opinion the liming story has never been gotten across to the 50 percent to 75 percent of the farmers who need it most. This is the group that has to be shown that the net return from two properly limed and fertilized acres will usually exceed that from three fertilized but unlimed acres. These are the farmers who are difficult to reach with extension information since they must be approached on an individual basis. It is also an unattractive group to the limestone salesman since many of its members are in poor financial condition.

" 'The 25 percent to 50 percent of our farmers who use enough, or too much liming material probably account for 90 percent of the total material used. I feel that the reduction in use of limestone by this group as a result of the mandatory soil test has been wise. Many of our fields here in New Jersey were overlimed. Yet lime material sales would be still climbing if it were used where indicated by the pH test.'

"The decline in tonnage sales should not be blamed upon the mandatory soil test. While any experienced soil scientist will admit that under certain conditions the test may not be entirely accurate, in the great majority of cases, it is a perfectly good analysis for the purpose intended. Arguments for its abandonment are no more convincing than those which might be advanced in favor of substituting a guess for a diagnosis based upon years of good scientific research, whether it be in the field of medicine, entomology or soils.

"We must face the issue realistically. That group of farmers who are not using liming material today are those which it is going to take more than an easing of the A.C.P. mandate on a lime test to pull out of their present doldrums. Among these is a certain segment that no amount of persuasion will ever get around to using liming material. There is hope for many, however, who, for one reason or another, have not made liming one of their standard practices. Financial difficulties plague many of this group. This presents an opportunity for the limestone industry to convince those who are in a position to advance funds for worthwhile agricultural practices. Another group are the young farmers or farmers-to-be in the vocational schools who are usually much more amenable than their elders. No opportunities should be lost in getting the liming story across to the young farmers, and the younger the better. They might even be the means of selling their farmer-parents on the fundamental importance of liming.

"In the last analysis, however, the industry, like many others, is face to face with a buyer's market which is going to take a type of down-to-

• Due to the unusually heavy response to our request for articles from leading agronomists for the Agricultural Limestone Issue, space is not available to publish all the articles in this issue. The remaining articles will appear in the May issue.—The Editor

Type of agricultural limestone spreader truck operating in Wisconsin. It has been designed to spread uniformly, reducing windrows of finer material and has a 23-ft. boom

earth, door-to-door sales approach that wasn't needed over most of the last 15 years. There is no magic solution to the problem of selling the lower 50 percent of the potential customers in any field. I'm afraid this holds for limestone as it does for fertilizer, certified seed, spray materials, and many other agricultural materials."—R. B. Alderfer, chairman, Soils Department, New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick, N. J.

Indiana

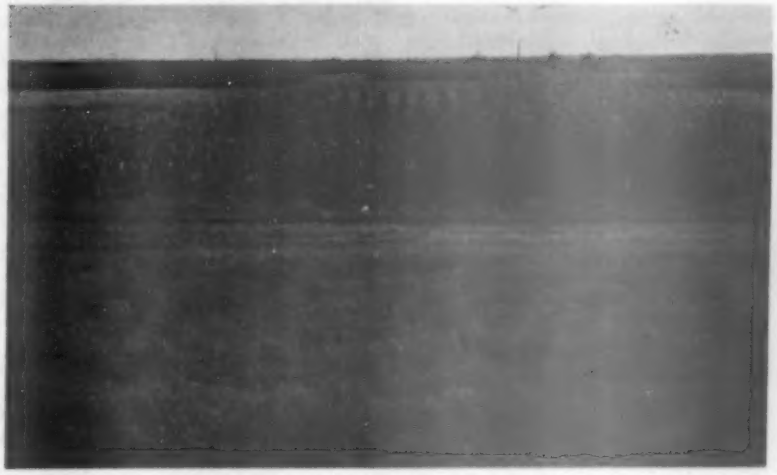
"As far as Indiana is concerned our records seem to show the tonnage of limestone has leveled off at about the same tonnage for the past five years. So we are definitely and apparently a little out of line with some of the other states or regions.

"I think that you can count on fewer farmers participating in the A.C.P. program as a number of them will be automatically out of it because of not maintaining their acreage allotments. This very likely will result in reduction in the use of liming materials since many farmers use the funds to this end.

"I believe that many limestone producers have been more or less lulled to sleep trusting in the government program to maintain the demand for limestone and as a result very little promotional effort has been made. Now it is going to take more promotional efforts to accomplish this purpose and I think it is a good time for the producers to cooperate and support all extension agencies in their efforts to carry out a well rounded fertility program.

"Certainly one of the approaches at the present time should include the value of maintaining and establishing legume stands which are the most dependent crops upon liming of any. The cost of the seed of these crops now is at the highest level on record and liming is one of the means of helping to insure stands and to reduce a risk of losing them. So why not make a drive now on the use of limestone to help insure a legume stand.

"There may be some decline in the immediate use of liming material due to the mandatory soil test requirements. I believe that there will be continued pressure on the part of the A.C.P. Committees backed by the government to require soil tests as a basis of liming. I feel from my experience that the tests are quite reliable and we are doing all we can to encourage farmers to have complete soil tests as a basis of both liming and fertilizing. So if these services can be maintained to take care of the large volume of farmers I think the producers should encourage soil testing and in the long run their business will be on a sounder basis. There is, of course, the possibility of over liming and this certainly would not benefit the liming program and in the long run would tend to curtail the use of lime.



An experiment conducted on a Missouri farm. The entire area had been limed alike and a rotation of corn, oats, barley and clover had been followed for 16 years. The left one-third has only had agricultural limestone, the middle third has had phosphate in addition, and the right one-third had both phosphate and potash additions

"It might be best for all concerned that the mandatory requirement be applied gradually and that the farmers, industry and all concerned be given a time of adjustment before it is made universal.

"I might add in conclusion that we are taking up the matter of liming more actively in our extension program and are giving it attention both in meetings and in publications and publicity. We are also giving more attention to the quality of lime materials particularly the fineness of grinding and encouraging farmers to give more attention to this aspect in purchasing the material."—M. O. Pence, Extension Agronomist, Agricultural Extension Service, Purdue University, Lafayette, Ind.

Connecticut

"We need hundreds of thousands more acres of alfalfa, Ladino and trefoil in the Northeast. To grow those legumes satisfactorily, most of our soils should be limed more liberally than they are now. It wouldn't require any unusual yields of those legumes to increase the present acre production 50 percent. The quality would also be greatly improved. Digestible nutrients for animals can be obtained from such forages for about one-third the cost in purchased grains.

"Acid subsoils is another phase of this subject. As I have pointed out in several articles, the most practical way of reducing the acidity of subsoils in humid regions is to add more liming material to the topsoil. As the upper horizon of soil becomes saturated with calcium, some will move downward and replace part of the acid forming elements in the subsoil. The more liming material one adds; the greater the penetrative effects at lower levels. By such means, we have decreased the acidity of the third foot of soil. In most cases there is no need of subsoil plows and other power consuming equipment to get liming material below the tilled layer. A brief summary of this work was printed in Grassland Progress, December, 1954.

"We think it requires about 500 lb. per acre of limestone *annually* to maintain our soils at a given degree of acidity. That costs about $2. If legumes are grown, that $2 worth of lime will save about $10 worth of fertilizer nitrogen.

"Compulsory soil tests for A.S.C. help. I am in favor of such tests, for I believe that over the years more liming materials will be used and better crops result than if we proceed 'by guess and by gosh.' Uncompulsory soil testing has increased the adoption of many desirable practices, including the use of the proper amounts of liming, so why kick a good servant now just because some farmers procrastinate about doing the worthwhile job of taking a few soil samples. Untold benefits have come to farmers whose only contact with a specialist is the soil test report and the recommendations on it. I think the main problem is to reach more farmers by *any means*, including soil tests.

"It has been stated that the use of liming material has been decreasing since 1947. Soil tests for A.S.C. help were not required until 1954. From these facts one might surmise there

are other factors, besides the required soil tests, involved in the decreasing use of lime."—B. A. Brown, Agronomist, Storrs Agricultural Experiment Station, The University of Connecticut, Storrs, Conn.

Ohio

"A review of the figures on the amounts of liming material used on land during the past few years presents an alarming picture. Consumption has fallen off drastically on a national basis and in Ohio has dropped materially in 1953 and 1954. This is cause for concern when one realizes that the top consumption figures are far below the amounts that should be used for crop production. It is also puzzling to know why this should happen in view of the fact that the use of liming material is one of the basic considerations in the whole soil conservation program.

"Experimental work in many states has shown that in order to obtain good crop yields it is necessary to lime the land. This is definitely true on pastures, meadows, and other types of enterprises where legumes are a part of or the only plants grown. Many of the non-leguminous crops are greatly benefited by the addition of liming material to the soil. In Ohio, research work on the use of liming materials has been carried on continuously from about 1895 to the present date. The one important fact that stands out in this work is that liming pays in greater yields, not only for the crop that is limed but for almost all other crops in the rotation. The great value of liming materials in a crop production program has been thoroughly established thus it is difficult to know why more of this material is not used.

"In Ohio alone approximately 30 million tons of liming material are needed to bring the soils to a high level of fertility. To maintain this level an annual application of about 3 million tons are needed, whereas, 2,083,217 tons were used in Ohio in 1953. The present average soil reaction in Ohio is hardly being maintained.

"I am not only concerned about the decline in lime usage but by the fact that the peak consumption in the United States was far below our needs. Most of us have ideas on why liming materials as a soil amendment have not been used more extensively, however, because the problem is in our laps, steps must be taken to stimulate interest in this product. The following factors have a direct bearing on the subject:

"Many farmers are not fully aware of the importance of these materials on obtaining high crop yields. They do not realize that maximum yields can be obtained only when all limiting factors are eliminated; that under conditions where soils are very acid the use of a liming material not only increases crop yields but makes it more profitable to use fertilizers.

"The returns from the addition of ground limestone are extended over a number of years, thus, in comparison to fertilizer they may not seem as important in the farming operation. Therefore, the farmer invests his money in fertilizer and only buys liming material if he has available funds. In many instances he needs three to five tons of liming material to the acre thus his cost may be 25 dollars or more per acre, whereas, the cost of fertilizer per acre will seldom exceed one-half of this amount. If the amount of liming material is reduced to one or two tons per acre, when he needs five tons, the increases in crop yields will be low and he will assume that liming is not very beneficial.

"It is difficult for a farmer to know what his land needs most therefore the most obvious needed amendment is usually selected. Soil tests help greatly in making this decision and in most instances will indicate whether lime or fertilizer is urgently needed to increase crop yields.

"There is a distinct lack of educational material for farmers on the value of limestone for crop production.

"It appears that a closely coordinated program between the A.S.C. and the limestone producers could be developed that would increase sales. In many states the A.S.C. requires soil tests or certain historical data on the land to support payments for the use of liming material. Since this is the case the limestone producers should strongly urge the farmer to have his soil tested. In Ohio, one distributor of liming material is contemplating paying one half of the cost for the soil test thereby reducing the cost of this service to the farmer and helping him in obtaining not only lime recommendations but those for fertilizer also.

"I may be wrong in this but it seems that there is not enough promotional literature on liming materials. Limestone producers depend to some extent on Experiment Station and Extension bulletins for the only material to be passed on to farmers. This is not enough to do the job. Besides the use of educational material, the radio should be used quite extensively in calling the merits of limestone to the attention of farmers. Prompt delivery of a good quality limestone will improve repeated orders on liming material. Very seldom does a farmer lime all of his land in one operation, therefore a job well done on the first attempt should bring in repeated orders in subsequent years."—G. W. Volk, Chairman, Department of Agronomy, Ohio Agricultural Experiment Station, Columbus, Ohio.

Oregon

"The use of limestone is such an old practice that many of us take it for granted. Too many of us are lulled into lethargy with the idea that we know that the use of limestone is good so why carry out additional research. But do we really have the essential research facts that are so important in carrying forward either a sound educational program or sales and promotional program on increasing the efficient and effective use of limestone? It is true that we have volumes of research data on the use of limestone, yet repeatedly in many areas questions arise on which we do not have adequate research. Lack of sufficient research data is one of the reasons why soil test recommendations for the liming practice may vary between states. There are still unanswered questions as to just how much limestone can be used profitably for certain types of cropping systems on certain soils. We are convinced that we need an expanded research program on limestone and its use on acid soils here in Western Oregon if we are going to have the proper kinds of facts on which to base our extension educational program and our limestone recommendations. Also, we need additional research on the lime requirement test.

"Soil tests are the best guide that we have for predicting the need for limestone on farmer fields. There has been a tremendous increase in the number of soil samples tested for farmers throughout the United States during the past 10 years. Soil tests when properly used have contributed greatly to increased efficiency in the use of limestone. In many cases soil tests have helped to point out to the farmer the fact that his soils were acid and that he could expect profitable responses from the use of limestone. In certain areas they have also pointed out that additional limestone was not needed since the soil was already at a desirable soil reaction. Soil testing is only a tool but when properly used and when based on adequate research facts it can be a very powerful tool for increased use of limestone.

"In Oregon, farmers cannot collect cost sharing benefits under the A.C.P. program for limestone unless a soil test shows that it is needed and will likely be efficient. The soil test helps to insure that government payments for limestone will be used only where

limestone is likely to be needed for increased production, particularly of legumes. At the same time, on many of our Western Oregon soils that are quite acid, it points out to the farmer the need for more liming than he had originally planned to apply. In fact, in most cases soil test results will point up the need for more liming materials than most farmers were planning to apply or felt that they needed. Getting a large number of soil samples tested in an acid soil area such as Western Oregon further strengthens the educational and sales program.

"A farmer who gets his soil tested and gets the results back showing the need for two, three, four or five tons of limestone per acre is much more apt to believe that he really does need it and that it is likely to be profitable to use it than if somebody merely tells him that his farm is located in an area that is usually acid and that if he put on limestone it should do him some good. The results of soil tests become increasingly meaningful if they are calibrated with adequate field experiments showing the actual increases in production of crops grown in the area and what this increase means in terms of increased income.

"Many groups and individuals can make a contribution to an effective overall limestone program in an area or state. The Experiment Stations and the Extension Services of the Land-Grant Colleges, the Agricultural Stabilization Conservation Program, fertilizer producers and distributors, state control officials, and many others can all contribute. The integrated cooperative effort of all such groups and individuals working on one program can do so much more effective than each going their separate way."—H. B. Cheney, Head, Department of Soils, Oregon State College, Corvallis, Ore.

Indiana

"I believe that the soil test is one factor which can be used to promote the use of limestone. The soil testing laboratories over the country are finding that there is a surprisingly large number of soils which need liming materials. Farmers are not aware of this situation and they should be encouraged to take soil samples to see whether they do need liming or not. A compulsory soil test for liming is a very good one since farmers will frequently get into difficulty if they put on liming materials where they are not needed. Where they do need liming, they should put on enough to do the job. This can be found from a soil test. I believe that soil tests will be the most effective long time means of promoting the sale of limestone.

Experiment on farm at Darlington, Wis. Note affect of agricultural limestone application on alfalfa, to the right, as compared to the smaller, less vigorous growth, to the left, without agricultural limestone

The returns which are obtained when liming is done according to its needs will be much more beneficial to the farmer and make the product much more attractive."—S. A. Barber, Associate Professor of Agronomy, Agricultural Experiment Station, Lafayette, Ind.

Illinois

"Some believe that the decline in the use of limestone in Illinois is due to the fact that Illinois farmers have used a large tonnage of limestone for more than ten years and many of our farmers are not caught up with their liming program and are devoting more of their soil improvement dollars to phosphate, potash, and nitrogen. It is certainly true that they are devoting more of their investment in soil fertility to phosphate, potash and nitrogen. However, the results from the testing of several million acres of farm land through our soil testing laboratories indicate that only about 50 percent of our land has sufficient limestone. So there is still a large acreage that needs liming but probably many of those farmers who have not yet limed their farms are those who will be the most difficult to sell. Some of the unlimed land will, of course, be permanent pasture land. We have made very little headway in selling farmers on the improvement of their permanent pastures through liming, fertilizing and seeding legumes and grasses. So, while many farmers have for the present caught up on their liming program, I do not feel that this is the principal reason for the drop off in the sale of limestone.

"It seems to me that limestone producers might well study the fertilizer program that is at present being promoted over much of the country. Is agriculture limestone getting its fair share of the farmer's dollar? Is the plant food being sold in the most economical form and do the popular recommendations on the use of fertilizer make for a sound fertility program? Is it a matter of getting rid of as much fertilizer as possible at the highest price without much concern as to whether or not it is the best program from the standpoint of the farmer? Is considerable money being spent on a fertilizer program that pays little or no benefit to the farmer which should better be spent on needed limestone?

"Here in Illinois we have attempted to base sound plant food program on the test of the soil. We have been testing soil for acidity since the first soil testing project was organized by Dr. Bauer about 1922. We have continued through the years to emphasize soil testing as a major activity in our soil extension program. The phosphorous test was included in the testing project through 1930. Later the potassium test was added. Soil testing has played an important part in increasing the use of limestone in Illinois to 950,000 tons in 1929 and to the record of over 5,500,000 tons in 1946. The soil testing is at present carried on through more than 80 county soil testing laboratories. These laboratories are under supervision of the county farm adviser. There are, in addition, about 30 commercial soil testing laboratories in the state. In 1953, the last year for which we have records, the county soil testing laboratory tested approximately 1,500,000 acres for about 49,000 farmers. We know of no better method of promoting limestone as well as other needed soil treatment materials than by showing 49,000 farmers or more, each year, a map of their fields or a soil test report which indicates whether or not limestone,

phosphate, or potash is needed and how much of each is needed to the acre. We feel rather sure that without our soil testing program our limestone tonnage would have declined much more sharply.

"I do not have any suggestions for easy or unusual ways of building back the tonnage of limestone. It may be that we have depended too much on the government to sell limestone for us. It looks to me as though the limestone producers as well as the colleges of agriculture need to face up to the problem and recognize that we need to put more effort into both the promotional and educational phases of limestone use. I recognize that the industry does not have the margin of profit to carry on an advertising campaign comparable to that of the fertilizer industry but I believe that there are many things that can be done by the industry that may not be too expensive. For example, almost every community in Illinois has one or more limestone trucker. These men could probably be made much more effective salesmen if we could work out some way of keeping them better informed on limestone as well as the other phases of soil management. Maybe we need to go back to limestone demonstrations in order to remind farmers of the value of limestone. I believe also that the limestone producers can help by promoting soil testing. I believe that this is one of the most important and effective promotional as educational methods. Attractive limestone posters and folders might be another way of reminding farmers.

"Here in Illinois and I presume that the same would hold for many of the other states, there is terrific competition for the farmers' plant-food and soil-improvement dollar. For several years the major emphasis in the field of soil fertility has been on fertilizers, especially nitrogen and mixed fertilizers. Other important phases of a balanced fertility program such as limestone, legumes, organic matter, soil tilth, and erosion control are almost forgotten. While no one questions the importance of lime in the soil management program, limestone is getting little attention by either agricultural colleges or farm magazines. I do not believe that I have seen more than two or three articles on limestone in farm magazines during the past ten years. But every issue of every magazine is loaded with articles carrying high pressure selling, on mixed fertilizers and nitrogen. Often such articles are based on little or no research and instead of sound information we get low-grade propaganda designed to unload any kind of fertilizer on the farmer. An example of this kind of propaganda was the promotion of plow sole fertilization a few years ago. This practice was based on one year's work on the farm. It involved the use of a plow sole attachment on the breaking plow and stringing the fertilizer in a ribbon on the bottom of the plow sole. I understand there were 500 plow sole attachments sold in Illinois alone. Today I am sure there is not a single plow sole attachment in use.

"The things that make the headlines are the things that are the most profitable for someone to sell rather than those which are the most profitable for the farmer to use. Here is a typical example, the mulch planting of corn has been making headlines for a number of years. This practice calls for the use of rather large amounts of fertilizer and the sale of some expensive machinery. Another new practice in corn planting is the method of planting in the tractor tracks. This practice gets little or no publicity. The reason, of course, that it is not making headlines is that no one is selling tractor tracks.

"Another problem is that a considerable amount of money is going into the purchase of mixed fertilizers and nitrogen is not very efficiently used. For example, mixed fertilizers containing potash are being sold in sections of the state where practically all of the soils are high in potash. This is money that should be used for limestone or phosphate which are needed. On the other hand, in southern Illinois where the potash is quite deficient, the farmers that use these mixed fertilizers are not usually applying enough because they cannot afford the big investment that is required to supply potash in low potash mixed fertilizers. This means lower yields and lower income for the farmers and, of course, less money with which to buy limestone. Nitrogen is also being sold to many farmers where it is not giving results. In some cases, this failure to get results has been due to the fact that a good legume program has already supplied plenty of nitrogen to their soil or, in other cases, because they have followed such a poor soil management program that poor soil tilth limits their production more than the lack of nitrogen.

"Since commercial nitrogen has been available in fairly large amounts, there has been a tendency on the part of some people to discredit legumes and promote nitrogen as a substitute for legumes. They neglect to mention that even if commercial nitrogen could be substitute for legume nitrogen, legumes are still necessary for the maintenance of good soil tilth and the control of erosion. There is also the theory which is not yet supported by any dependable research that nitrogen plowed under with cornstalks will be just as good as clover or alfalfa in maintaining tilth and controlling erosion. Limestone and legumes go together. If farmers are led to believe that they no longer have to grow legumes, they will feel sure that limestone is no longer important." — C. M. Linsley, Professor, Soils Extension, College of Agriculture, University of Illinois, Urbana, Ill.

Minnesota

"To get wider distribution in use of limestone throughout the nation, and Minnesota is no exception, there is need for more promotional work. By that I mean more publicity, more demonstration and experimental work, and more educational work. Many years ago I did a lot of work on liming, experimental and demonstrational, using the same kind of publicity now being used by the fertilizer industry. It got excellent results. Tonnage was increased many times. This, I think, is one way to stress increasing the use of limestone in private sales outside of the A.C.P. I think too much publicity has been put out through the national limestone association depending upon and encouraging the subsidy payments when the talk and publicity should be encouraging the use of limestone and the right methods which should be used in applying it. It should cover and stress such things as the efficiency of use of fertilizer from limestone, the effects on the legume crops, and the value to other crops in the system, nutrient composition of crops, and the general value of liming as a basic fertility practice. I think the liming industry needs to go back and follow some of the practices followed 20 years ago where special emphasis was placed on an educational program for the use of limestone.

"As to the mandatory soil test, the handwriting is on the wall. If we take into account that every state has established a soil testing laboratory to determine their fertility needs, it indicates that soil testing is here to stay. We are eventually going to require soil tests to determine liming needs the same as any other fertility practice that is being used on our soils. We are at the present time in the stage of question about tests, but I think it is important to talk soil testing in the liming industry just the same as the fertilizer industries are talking soil testing. If farmers spread limestone on land that does not need lime, as we have had many cases in Minnesota, they are not going to be

(Continued on page 116)

KING SIZE SWING HAMMERS
Last 10 Times As Long With Stoody Hard-Facing

A large bauxite mill in the South crushes limestone used as a flux in the reduction of the ore. The hammer mill used here has 15 hammers to the set, each hammer weighing 300 pounds. Rotating at 750 RPM, the hammers are subjected naturally to extremely severe abrasion and impact—edges and corners are soon rounded off, resulting in greatly reduced efficiency and lowered production of properly sized aggregate. Ordinary manganese hammers operated for only one week; *as hard-faced, they now last 10 weeks!* Spare sets are available at all times for installation in the mill while the worn parts are being rebuilt.

Standard procedure now consists of bringing wearing areas back to size with Stoody Nickel Manganese, topped off with a final pass of Stoody 21. As a rule only about 12 to 15 pounds of manganese are required for rebuilding and two pounds of Stoody 21 completes the hard-facing.

Detailed information on maintenance of all types of crushing equipment is contained in the Stoody Guidebook, a copy of which you can obtain from your Stoody dealer (see the yellow pages of your telephone book) or you may write directly to Stoody Company. This famous manual is available without charge, of course.

The hammer in the foreground shows the metal loss in operation: leading edges have been completely worn away.

A hammer rebuilt and hard-faced, ready to be returned to the mill. Hammers can be reclaimed many times and service life prolonged indefinitely.

STOODY COMPANY
11929 East Slauson Avenue
Whittier, California

Dragline picks up screenings from quarry belt conveyor and places them over tunnel conveyor

Vibrating screenings are dropped onto belt conveyor in loading tunnel and transported to rod mill

Push-Button Controlled Fine Grinding Limestone Plant

• Dolomite Products, Inc., Ocala, Fla., opens new plant at Gay, Fla., which produces 40 t.p.h. of finely ground limestone, using a rod mill with oil-fired furnace supplying warm air for drying while grinding the screenings raw material

By C. E. WRIGHT

BY PUSH BUTTON CONTROL of a completely mechanized and electrified new plant, Dolomite Products, Inc., Ocala, Fla., is able to turn out 35 to 40 t.p.h. of finely ground high calcium agricultural limestone with only six men, including the superintendent.

The new plant, which went into operation last August, is at Gay, Fla., 2½ miles west of Brooksville, and it is near the limestone quarries of Camp Concrete Rock Co., from which screenings are obtained as the raw material for the Dolomite Products operation.

A unique feature of the plant is the use of a rod mill instead of a hammermill for pulverizing the limestone screenings. Hammermills are used in the company's other Florida mills at Sarasota, Lebanon and Kendrick.

As the screenings pass through the rod mill, hot air from an oil-fired furnace is fed into the mill at each end. Thus, the material is ground and dried in one operation, an innovation in plants of this type. As the limestone screenings, exposed to the weather, will absorb from 8 to 15 percent moisture by weight, the economy of this dual grinding and drying procedure is obvious.

From overhead V-shaped storage bins in warehouse, to the right, agricultural limestone is loaded into box cars by belt conveyor and swivel loaders at rate of one ton a minute

Rod Mill for Grinding

The rod mill, a standard type manufactured by the Kennedy-Van Saun Manufacturing & Engineering Corp., Danville, Penn., was adapted to this particular process for the first time. Mounted on a 12-ft. concrete base, the 6- x 12-ft. mill weighs 59,000 lb., plus 48,000 lb. of grinding rods. The 3-in. dia. rods are made of open-hearth, hot-rolled, machined steel.

Although the product being ground is a hard rock containing approximately 95 percent calcium carbonate, there was no appreciable wear on the rods after seven months' use, so the company has not had any experience as to when they might need replacing.

The Camp Concrete Rock Co. has found an additional outlet for a by-product, and the farms and ranches of Florida, which require frequent applications of liming materials because of acidity from the large quantities of fertilizer that must be used, have an additional source of supply.

Long Conveyors—Quarry to Plant

Screenings from the Camp Rock Co. quarries, which produce aggregate for road construction and other concrete work, are moved by a series of belt conveyors for about a mile to a stockpile over a steel pipe reclaiming tunnel at the Dolomite Products plant. Screenings are fed to the tunnel belt conveyor by gates to vibrating hoppers equipped with feed screws to control the flow so that only sufficient material to supply the rod mill is fed to the conveyor.

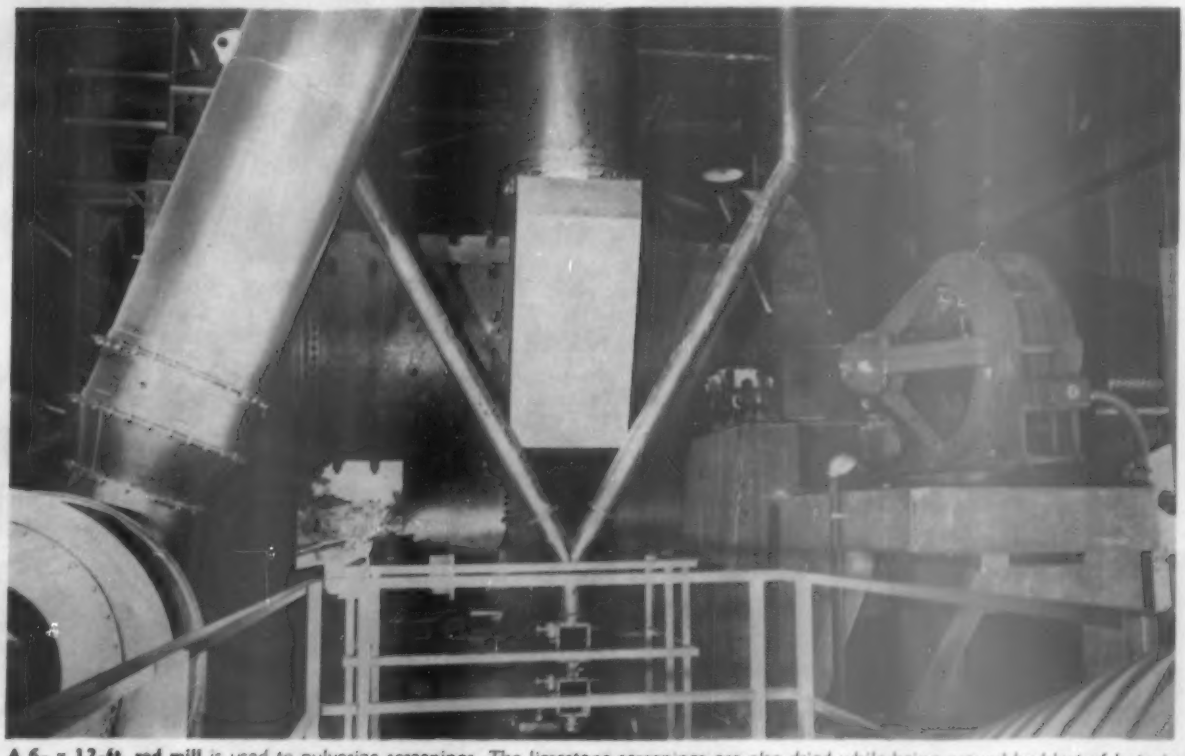
From the tunnel, the belt conveyor moves up an incline for 150 ft. to the mill. The belt conveyor is operated by a 5-hp. motor. Screenings, which range from about No. 8 mesh to fines, are fed to the rod mill through feed screws at each end in quantities of 4 to 5 cu. yd. A 200-hp. motor supplies the power. While the rod mill is operating, hot air under pressure, is forced through it. The temperature inside the rod mill averages about 170 deg. F. The oil-fired furnace which supplies hot air was designed by Frank M. Murphy & Associates, Bartow, Fla. It burns Bunker C fuel oil.

Covered belt conveyor from mill house to storage bins in warehouse keeps finely ground limestone from absorbing moisture from rain or humid air

The ground and dried limestone is transported by a covered conveyor from the rod mill to four overhead storage bins in the loading warehouse, which protects the product from reabsorption of moisture from rain or from humid air. These V-shaped bins hold 225 tons each. Three are bulk bins for box car loading, the other is directly over a St. Regis bagging machine, which can fill twelve 100-lb. valve type bags a minute.

Each bulk bin is equipped for feed-

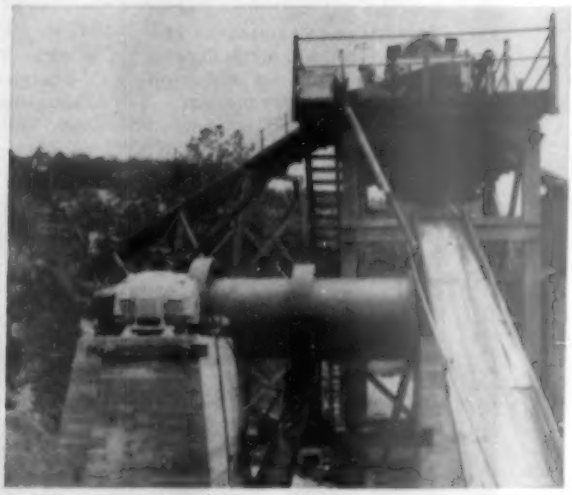
(Continued on page 186)



A 6- x 12-ft. rod mill is used to pulverize screenings. The limestone screenings are also dried while being ground by blast of hot air from oil-fired furnace

KENNEDY

noted for



KENNEDY 4' x 10' CENTER DISCHARGE ROD MILL FOR SPECIFICATION SAND AT FRANK M. SHEESLEY CO. KUNKLETOWN, PA.

ONE OF TWO KENNEDY 5' x 12' CENTER PERIPHERAL DISCHARGE ROD MILLS AT REFRACTORY SAND CO., ANDREAS, PA.

· ROD · MILLS

.....low maintenance and exact specifications

in manufacture of SAND

See what Mr. Neal McMullen, manager of Frank M. Sheesley Co. reports on KVS Rod Mills:

"We are one of the very few Companies in our area capable of making sand to the rigid Turnpike specifications. Our KENNEDY Rod Mill is, in large measure, responsible for this ability to produce and hold gradation. We investigated thoroughly before buying and are now certain it pays to own the best."

KVS Rod Mills built to perform a specific, and important, function...producing a grade of sand to meet rigid specification. These mills not only meet these requirements, they continue to make sand of a *uniform grade*, economically and without costly maintenance.

Whether your pulverizing and grinding problems involve sand, cement, lime or coal, KVS has the equipment you need that is best suited for the job—

KVS sales-engineers are available for consultation anywhere—anytime!

Let us run a KVS Rod Mill test on your material.

WE'LL PROVE TO YOU THAT....

IT COSTS LESS TO OWN THE BEST!

SEND FOR BULLETINS DESCRIBING KVS MACHINERY AND EQUIPMENT.

KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE · NEW YORK 16, N. Y. · FACTORY: DANVILLE, PA.

MATERIALS ACCOUNTING
In Processing Portland Cement

• Method of calculating material balance which the Puerto Rico Cement Corp., has found to be efficient in producing various types of cement

By ARTURO VERA JR.*

IN ANY PROCESS, the basic equation for a material balance is: Raw materials used plus additives minus losses equals finished product plus by-products.

In cement manufacture the raw materials used can be classified as follows:

Calcareous	Calcareous-Argillaceous	Argillaceous
Limestone	Cement Rock	Clay
Marl		Shale
Oyster shells		Slag

For corrective purposes the following raw materials are used:

Siliceous	Ferrous
Sand	Iron ore
Sandstone	Mill scale

The additives are: gypsum, grinding aids, air entraining agents or plasticizers, water, slurry fluidity aids such as salt or sodium trypolyphosphate. Some plants have been known to use gypsum as a slurry fluidity agent[1] as a set retarder in finished cement. Coal ash can be considered an additive or more specifically, a contaminant, if pulverized coal is used as fuel; frothing agents in minute quantities in froth flotation is part of the process; and carbon black[2], if used as a color standardizer.

The losses in cement manufacture are: water, carbon dioxide, stack dust.

The finished product of course, is cement. There are no by-products except in the case of a few plants during World War I which extracted potash from stack dust. Dry ice was also produced from carbon dioxide in stack gases.

Some plants in Europe[3] manufacture sulfuric acid from gypsum and produce cement as a by-product. The process consists of heating in a rotary kiln a mixture of gypsum and carbon with clay, sand and bauxite whereby sulfur dioxide is evolved and a cement clinker is obtained. The SO_3 is converted into sulfuric acid by one of the orthodox processes and the clinker is ground with raw gypsum to produce cement.

Another method,[4] known as the Basset process, has been used in Europe and Japan, by which with small changes in raw mix composition, burning temperatures and technique, pig iron is tapped from the kiln.

An interesting method[5] of producing cement is through the use of oil shale and limestone. The greater part of the fuel is in the raw materials.

In this article we shall not consider the special cases mentioned for material calculations; only the standard process for manufacturing cement by using a calcareous and an argillaceous material with sand as a corrective.[6].

Daily Production Calculations

I-A SLURRY PRODUCED:

The most exact way of determining total slurry production is by differential tank measurements and subsequent conversion to weight of dry matter. Slurry in stock day before less slurry calcined equals available slurry. Slurry in stock today minus available slurry equals slurry produced.

A daily inventory of slurry in stock is made by converting volume of material in tanks to potential calcined clinker. The data needed are:

Variables

Percent moisture in slurry
Specific gravity of slurry
Height of material in tank
100 minus percent water equals percent solids

Constants

Volume of tank per in. depth
Density of water at STP (62.43 lb. at 39.2 deg. C.)
Dry matter equivalent to 1 bbl. clinker (Approximately 600 lb.)

Specific gravity times 62.43 equals weight per cu. ft. raw mix

Weight per cu. ft. raw mix times percent solids equals dry matter per cu. ft.

Dry matter per cu. ft. times cu. ft. per in. of tank depth equals dry matter per in.

Dry matter per in. times total in. material in tank equals dry matter in tank

Dry matter in tank divided by 600 equals barrels potential clinker from slurry in tank

EXAMPLE: A cement plant has seven cylindrical proportioning tanks, 20 ft. diameter by 20 ft. high; three mixing, storing and feed tanks 51½ ft. long (circular ends), 20 ft. wide, 20 ft. deep. Each inch depth of storage and feed tanks is equivalent to 78.68 cu. ft. Each inch depth of proportioning tanks is equivalent to 26.23 cu. ft.

This can be simplified in a specific plant by grouping together all the constants into a factor. In this case the data is for tanks 8, 9 and 10:

Volume of tank per inch of depth equals 78.68 cu. ft.

Density of water at STP equals 62.43 lb. per cu. ft.

Dry matter equivalent to 1 bbl. clinker equals 600 lb.

$$\frac{78.68 \times 62.43}{600} = 8.1866$$

EXAMPLE: Tank No. 10

224 x .63 x 1.663 x 8.1866 = 1921 bbl.

Or by using logarithms.

Log inches plus log solids plus log Sp. gr. plus log constant equals log bbl. in stock

2.3502 + 9.7993 − 10 + 0.2209 + 0.9131 = 3.2835

Antilog 3.2835 = 1921 bbl.

(Continued on page 94)

Slurry Inventory

Tank No.	Measure	Percent H_2O	Percent Passing 200 Mesh	Percent $CaCO_3$	Specific Gravity	Percent Solids
1	60 in.	36.8	88.92	76.40	1.659	63.2
2	227	38.8	86.92	72.44	1.605	61.2
3	228	38.0	90.00	83.86	1.652	62.0
4	228	48.0	85.76	81.26	1.478	52.0
5	141	37.4	89.49	82.24	1.661	62.6
6	30	36.0	83.06	76.90	1.674	64.0
7	30	37.2	88.25	76.60	1.651	62.8
8	176 in.	37.4	88.17	76.60	1.659	62.6
9	218	37.0	88.88	76.60	1.664	63.0
10	224	37.0	88.88	76.60	1.663	63.0

Tank No.	lb./cu. ft.	lb. dry matter per cu. ft.	lb. dry matter per in.	lb. dry matter in tank	bbl. potential clinker from slurry in tank
1	103.57	65.46	171.70	10,302	172
2	100.20	61.52	160.84	36,510	609
3	105.13	63.94	167.71	38,238	637
4	92.27	47.98	125.55	28,694	478
5	105.70	64.92	170.29	24,011	400
6	104.51	66.89	175.45	3,509	58
7	105.07	64.73	169.79	3,396	57
8	104.20	65.23	513.24	90,328	1505
9	103.88	65.44	514.88	112,244	1871
10	103.82	65.41	514.65	115,282	1921
			Total bbl. in stock		7105

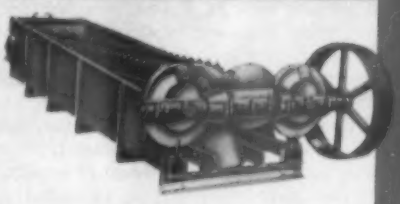
*Chief chemist, Puerto Rico Cement Corp., San Juan, P. R.

McLANAHAN

for dependable-low cost FEEDING, CRUSHING, CLEANING in

All Steel Rockmaster Single Roll Crusher for primary or secondary work on shovel loaded rock and ore.

A pioneer in the development of many types of processing equipment, McLanahan has served domestic and foreign pits, mines and quarries for more than a century. Shown on this page are a few illustrations of McLanahan equipment for crushing, washing, sizing and conveying all types of ore, coal and rock. Technical details and price information will be sent upon request.



Log Washer for removing tough clay and soft rock from various materials.

Steel Paddle Mill Scrubber—high capacity for cleaning large size feed.

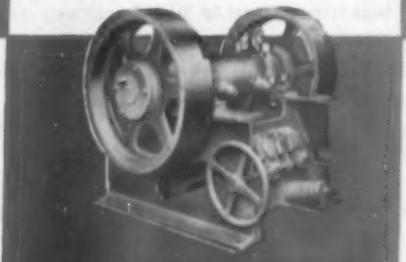
Heavy Duty Reciprocating Plate Feeder. Handles any material from sand sizes to shovel loaded rock and ore.

Low-set Grizzly for sizing and feeding various products.

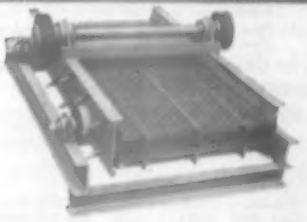
Double duty combination Scrubber and Sizing Screen for large and small capacities.

Heavy Duty Fabricated Double Roll Crusher for secondary reduction of rock and ore.

Double Screw Washer (with gear cover removed), for removal of waste and water from sand and similar materials.



Fabricated Jaw Crusher for primary and secondary work.



Single and Double Deck Vibrating Screens in different sizes.

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

Hollidaysburg, Pennsylvania

DEPENDABLE PRODUCTS:

Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Ball Grinding Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Screw Washers, Sand Dryers, Rotary Jigs, Dry Pans, Sizers, Sand Washers, Rotary Coolers, Separators, Magnetic Pulleys, Tramp Iron Pickers, Bucket Elevators, Screw Conveyors, Car Pullers, Car Spotters, Car Shovels, Tramway and Aerial Carriers.

II SLURRY CALCINED: The same method is applied here. The total amount of inches from feed tank fed to the kilns is converted to clinker. Slurry calcined = clinker calcined.

EXAMPLE:

		Logarithms
Inches calcined A shift	169	
Inches calcined B shift	177	
Inches calcined C shift	189	
Total inches calcined	535	2.7284
Percent solids	62	9.7924 — 10
Specific gravity	1.664	0.2212
Log constant		0.9151
		13.6551 — 10
Log clinker calcined		3.6551
Theoretical clinker calcined		4520 bbl.
Stack dust correction		— 100 bbl.
Clinker calcined		4420 bbl.

APPLICATION:

Slurry in stock day before	7650 bbl.
Slurry calcined	— 4420
Available slurry	3230
Slurry in stock today	7708
Available slurry	— 3230
Slurry produced	4478 bbl.

I-B SLURRY PRODUCTION FROM BASIC RAW MATERIALS:

Data:

Dry limestone — 93 percent calcium carbonate, 12 percent clay

Dry clay — 10 percent hydrated material (loss on ignition)

Sand — assumed dry and containing 100 percent silica (actually 99+)

The weather conditions are such that the water content varies considerably so moisture determinations must be made to reduce the materials to a dry basis.

Water, of course, is used as an additive in the process for the production of slurry but as all water added subsequently to the weighing of materials is lost on calcining, it cancels out where calculations are made on an ignited basis.

SLURRY PRODUCTION, IGNITED BASIS:

(1) Dry limestone used (.88) = Calcium carbonate

(2) Calcium carbonate $\left(\frac{CaO}{CaCO_3}\right)$ = Calcium carbonate (.56) = Calcium oxide

(3) Dry limestone used (.12) = Clay in limestone used

(4) Clay in limestone used (.90) = Dehydrated clay in limestone

(5) Dry clay used (.90) = Dehydrated clay used

The following equation may be formulated:

(6) Calcium oxide + dehydrated clay in limestone + dehydrated clay used + sand used = slurry produced (ignited basis)

EXAMPLE:

Limestone used (wet)	=	1152.576 tons
Clay used (wet)	=	236.515 tons
Sand used	=	21.784 tons
Limestone moisture content	=	10 percent
Clay moisture content	=	15 percent

DRY BASIS:

1152.576 (.90) = 1037.318 tons dry limestone
236.515 (.85) = 195.938 tons dry clay

(1) 1037.318 (.88) = 912.840 tons $CaCO_3$

(2) 912.840 (.56) = 511.190 tons CaO

If the percentage of $CaCO_3$ in limestone does not vary greatly, the two terms may be reduced to a common factor — a constant: .88 x .56 = .4928

(3) 1037.318 (.12) = 124.478 tons clay in limestone

(4) 124.478 (.90) = 112.030 tons dehydrated clay in limestone

The same simplification may be accomplished here combining the two constants into one: .12 x .90 = .108

(5) 195.938 (.90) = 176.344 tons dehydrated clay

(6) 511.190 + 112.030 + 176.344 + 21.784 = 821.348 tons slurry produced (ignited basis).

$\frac{821.348 \times 2000}{376}$ = 4996 bbl. slurry produced in terms of potential clinker

This method is not as exact as the former due to changes in $CaCO_3$ content of limestone, but where fluctuations are not very wide, it should check within 4 percent.

I-C SLURRY PRODUCTION FROM POIDOMETERS:

This method is unreliable in plants where the argillaceous limestones are usually moist. The clayey portion tends to agglutinate with the stone in the feed hopper, clogging the discharge and causing the feed belt conveyors to run empty during the time the belt man is dislodging the material.

Total feet run by limestone belt during day (from counter) x lb. limestone per ft. = lb. limestone ground.

Lb. limestone ground x percent clay used = lb. clay ground.

Total ft. run by sand belt during day (from counter) x lb. sand per ft. = lb. sand used.

$\frac{\text{Limestone} + \text{clay} + \text{sand}}{2000}$ = bbl. slurry produced

III-A CEMENT GROUND:

The most reliable method of calculating cement production is analogous to the method presented for slurry production.

Cement in stock day before less cement shipped equals available cement.

Cement in stock today less available cement equals cement produced.

EXAMPLE:

A cement plant has eight cylindrical silos 30 ft. diameter by 60 ft. high and two interstitial bins of 3000 bbl. capacity each. Each foot depth of the cylindrical silos is equivalent to 176.7 bbl. Each foot depth of the interstitial bins is equivalent to 50 bbl.

CEMENT IN SILOS:

No. 1	58 ft.	10,248 bbl.
No. 2	54 ft.	9542 bbl.
No. 3	31 ft.	5478 bbl.
No. 4	56 ft.	9895 bbl.
No. 5	37 ft.	6538 bbl.
No. 6	54 ft.	9542 bbl.
No. 7	28 ft.	4948 bbl.
No. 8	59 ft.	10,425 bbl.
		66,616 bbl.

CEMENT IN INTERSTITIAL BINS:

No. 9	60 ft.	3000 bbl.
No. 10	43 ft.	2150 bbl.
		5150 bbl.
Cement in feed bins		500 bbl.
Stock on floor:		250 bbl.
		750 bbl.
Total cement in packhouse —		72,516 bbl.

APPLICATION:

Cement in stock day before	72,516 bbl.
Cement shipped	— 5,250 bbl.
Available cement	67,266 bbl.
Cement in stock today	71,230 bbl.
Available cement	—67,266 bbl.
Cement produced	3,964 bbl.

III-B CEMENT PRODUCTION FROM POIDOMETERS:

The limitations of this method consists in belt conveyors running empty or not in full load due to large clinker balls clogging in the discharge.

Total feet run by clinker belt conveyor during day (from counter) x lb. clinker per ft. = lb. clinker ground.

Total feet run by gypsum belt conveyor during day (from counter) x lb. gypsum per ft. = lb. gypsum used.

$\frac{\text{Clinker} + \text{gypsum}}{376}$ = bbl. cement produced.

REFERENCES

1 Ponce Cement Corp., Ponce, P. R.
2 A.S.T.M. Bulletin, Dec., 1954
3 Chemical and Engineering News, Oct. 22, 1951
German—Leverkusen, Wolfen (Russian zone)
England—Billingham, Merseyside
France, Miramas
Chemical and Engineering News, Dec. 6, 1954
England—Widnes
4 Concrete, CMS, March, 1936
5 Rock Products, July, 1954
6 Puerto Rico Cement Corp, Guaynabo, P.R.

Canadian Cement Demand

OVERALL CEMENT DEMAND in 1955 is expected to equal that of 1954, according to J. M. Breen, president and general manager of Canada Cement Co. A continuing active demand for cement in highway and housing fields, as well as industrial expansion is anticipated, and a general price cut, which was effective December 1, 1954, is hoped to meet the threat of imports. The price reduction is estimated to cut cost of cement to customers by $1.8 million in 1955. The company is now in the midst of a $10,000,000 expansion program, the Fort Whyte, Manitoba, plant scheduled for completion by May, 1955, with an annual capacity of 1.5 million bbl. The Edmonton, Alberta, grinding plant is also scheduled for completion this year.

First Aid Techniques

THE NATIONAL SAFETY COUNCIL has announced three "safetygraphs" on first aid, each consisting of 12 pages with drawings and instructors notes for training small groups. The books are entitled: "How to Control Bleeding," which includes research by the Committee of Medicine of the National Research Council; "First Aid Treatment for Burns," discussing burns, frostbite, radiation and electric burns, as well as chemical burns of the skin and eyes; and "Transportation of Injured Persons," covering examinations of injured persons to determine spine or neck injuries, and use of common industrial equipment to transport the injured persons. Further information and prices are available from the National Safety Council at 425 N. Michigan Ave., Chicago 11, Ill.

Moves Plant

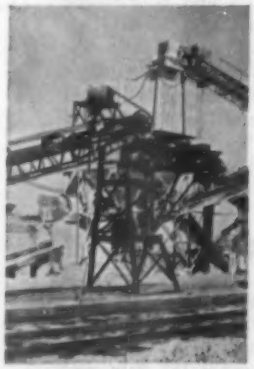
THE H-E-B CONSTRUCTION CO. has moved its Hobbs, Texas, crushed stone plant to the Wescott farm, southeast of Seminole, Texas.

"you can't beat... LIPPMANN AGLIME EQUIPMENT!"

Above, a LIPPMANN conveyor now in use at the Francesville Stone Company in northern Indiana. Mr. R. E. Ward, heading this successful aggregate operation, wrote the headline for this ad himself, and went on to say:

"We've Used Lippmann Since 1946!"

LIPPMANN CAR LOADER
Swivels in all directions! Most efficient loading method in all the industry!

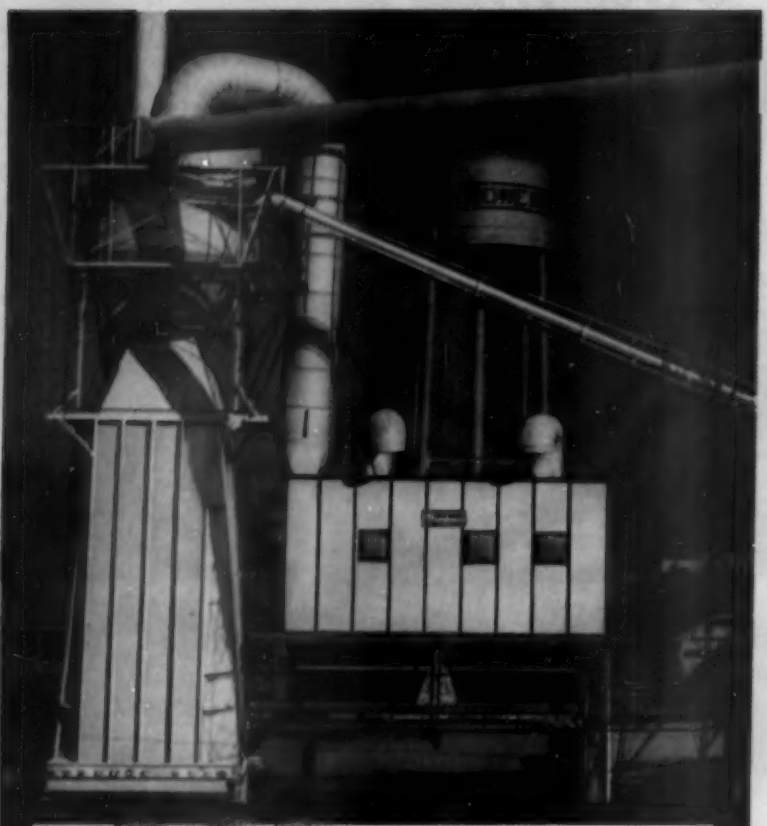


"We have in operation, at the present time, 97% of the original equipment and that has been operating at 99% efficiency since installed." *That's a direct quote from one of the foremost aggregate producers in Indiana — a man who knows what to expect from Lippmann Engineered equipment!* At Mr. Ward's operation, Lippmann Roll Type Secondary Crushers are now economically producing 40 to 50 tons of AAA agricultural lime per hour; Lippmann Belt Conveyors, after more than 7 years of continuous service, still hustle these tremendous loads along with practically NO maintenance. *That* kind of service means PROFIT, and in the aggregate industry, *LIPPMANN profit* leads the pack . . . confirming Mr. Ward's statements, as well as the statements of many others who consistently praise the performance of Lippmann Jaw Crushers, Pulverizers, Screens, and washing plants the world over. You too can "Look To Lippmann" for those extras in quality that spell more production and lower costs. See your Lippmann dealer or contact Lippmann Engineering Works, 4605 W. Mitchell St., Milwaukee 14, Wis.

LEW

LIPPMANN ENGINEERING WORKS

4603 W. MITCHELL STREET
MILWAUKEE 14, WISCONSIN



Dust makes it hot" for Rowe!

Pangborn Dust Control saves Rowe over $12,000 a year in heating costs

Dust used to "make it hot" for Rowe Manufacturing Co., Galesburg, Ill., by posing a serious problem. Rowe, a large producer of wood products (like the Ro-Way garage door), was troubled by the great volume of dust created by its many woodworking operations. Today dust makes it hot for Rowe in a different way! Thanks to Pangborn Dust Control, collected dust now fuels the boilers that provide steam for power and heat. The dust collected by Pangborn Dust Control saves Rowe over $12,000 in heating costs annually! In addition, Pangborn has improved community relations, employee relations and plant cleanliness.

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Dry or Wet Dust Collectors can save you time, trouble and money!

See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." Pangborn Corp., 4300 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn
CONTROLS DUST

Are Prices High Enough?

(Continued from page 81)

soil acidity reduces the effectiveness of fertilizer to a point that the farmer's investment in lime pays for itself in increased fertilizer availability? We do not need a reduction in the amount of fertilizer used on the farm. What we do need is a tremendous increase in limestone sales, which can only be developed by aggressive, intensified sales work by limestone producers at the farm level.

The surplus piles of by-product limestone will not be a problem if this is done. Agricultural limestone will then become a manufactured product, bearing its proper burden of the cost of production, overhead, and, above all, cost of sales and a fair profit. I believe that this is the challenge to each individual producer working selfishly in the interest of his own company to build his own tonnage. Collectively, the impact of such sales efforts will broaden the demand for liming materials; will reduce farmers' production costs; will satisfy the recommendations of the technical agricultural authorities and build for America a fertile land and a certain guarantee of adequate food for our growing population. A land rich in legumes and soil building crops is our bank of fertility and guarantee against surplus in specialized crops.

The feeding of a balanced ration to our soil is the very same basic idea as feeding a balanced ration to our farm animals. Yes, it is truly the same thing as feeding a balanced ration to human beings, in the interest of overall public health of our nation.

I feel certain that the agricultural limestone industry is on the verge of taking advantage of its opportunity. Just think of the sales momentum that would be generated if every producer allotted 10 percent of his plant sales price for sales and educational work at the local farm level. This would represent an annual expenditure for this purpose of between three and four million dollars a year for all producers. I contend that such a step would eliminate by-products per se, and the industry would achieve the proper stature which leads to future greatness.

Adds Cement Storage Silos

GRAND RAPIDS GRAVEL CO., Grand Rapids, Mich., has completed two cement storage tanks, each with a 5000-bbl. capacity, which, with the present 3000-bbl. silo, provide the firm with sufficient storage for approximately two weeks concrete batching operations. A 76-ft. elevator and an "air slide" system are used in filling the tanks.

New design doubles life of crawler tracks

KENSINGTON crawler tracks fit all standard crawler tractors

Under the most severe tests, KENSINGTON crawler tracks outlast ordinary ones 2 to 1. Part of this extra wear-ability, achieved under the severest of operating conditions, is due to several design improvements; part of it is the result of the use of wear-resisting alloyed manganese steel.

Here's how KENSINGTON has prolonged track life by design improvements: KENSINGTON tracks have only three parts — the rail, the pin and the grouser. Rails are cast in *one piece* to add strength and prevent wear caused by the constant twisting and weaving found in ordinary tracks. Heat-treated alloy pins are pressed tightly in place under high pressure for further rigidity and near-perfect alignment. Grousers have vulnerable parts heavied-up to reduce bending and breaking.

Yet, in spite of these design changes, KENSINGTON tracks fit all standard crawler-type tractors.

The development of several remarkable wear-resisting alloyed manganese steels, including ORO Supermang and Kenkrome, has also increased the wear-ability of KENSINGTON tracks. These already-hard metals resist wear when subjected to friction, abrasion and shock by constantly renewing their surface hardness. Yet, under this ever-hardening "skin," these metals remain tough and strong. That's why KENSINGTON uses Kenkrome in its rails and ORO Supermang for the grousers.

And that's the one-two of operators who use KENSINGTON tracks — the one-two that enables them to report reduced maintenance costs, longer periods of uninterrupted tractor operation and lower inventory of replacement parts. Further, these operators get increased tractor efficiency and pulling power because the KENSINGTON tracks keep their full "pull-bracing grouser area" for a longer period of time.

Purchase price of KENSINGTON tracks is only slightly more than that of ordinary ones. But they will save you a lot in repair bills on your tractor. They're shipped in belts from the factory, assembled for easy and quick installation.

Other wear-resisting KENSINGTON replacement parts

FOR TRACTORS
Kenkrome replacement rims for worn sprockets. Ready to weld on.

CRUSHER PARTS
Jaw plates, roll shells, mantles and bowl liners, hammers, grate bars and liners, etc.

FOR SHOVELS
Treads, rollers, racks, pinions and teeth . . . to fit all standard shovels.

CHAIN AND SPROCKETS
150 standard chains listed in new KENSINGTON Catalog plus many special chains. All of wear-defying Kenkrome.

Mail the coupon for further details on how much KENSINGTON tracks will save you in the "long pull."

Kensington STEEL COMPANY

KENSINGTON STEEL CO., Dept. R, 505 Kensington Ave., Chicago 28, Ill.
SUBSIDIARY OF POOR & CO., CHICAGO

Please send information on crawler tracks for tractor described below. I understand I will be under no obligation.

Make of Tractor_____
Model_____ NO. TRACKS PER BELT_____ WIDTH OF GROUSER_____
NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

Annual banquet of the National Crushed Stone Association held at the Netherland-Plaza Hotel, Cincinnati, Ohio

Crushed Stone Convention Uses Visual Aids to Stimulate Ideas

• National Crushed Stone Association annual convention in Cincinnati, Ohio has two sessions on current operating problems, and is given an analysis of the President's highway program, and status of legislation

TWO FULL SESSIONS ON OPERATING PROBLEMS were provided for in the program for the 38th annual convention of the National Crushed Stone Association held at the Netherland Plaza Hotel, Cincinnati, Ohio, February 7-9. Many other subjects of timely interest were presented in one of the best meetings in recent years. More than 700 were in attendance which was a good turn-out for a non-exposition year.

There were many innovations in the scheduled events both in manner of presentation in the business sessions and in the social events. Effective use was made of moving pictures and slides, and the monitor method of raising questions, in the operating meetings. Judging from the attendance at these sessions and comments heard afterwards, visual presentation is a most practical way to stimulate ideas. Another innovation was a very forceful demonstration of selling technique put on by two sales analysists.

The association is expanding its research efforts and has provided for the addition of two full-time men on the laboratory research staff. During the past year, extensive improvements and additions were made to the association-owned headquarters and laboratory in Washington, D. C. Membership consists of 136 active producers and 108 associate members, representing slight increases over 1954 totals.

The 39th annual convention and exposition is to be held February 20-22, 1956, at the Conrad Hilton Hotel, Chicago, Ill., which is the week following the conventions of the National Sand and Gravel Association and the National Ready Mixed Concrete Association. Place for the 1957 annual convention is still to be determined; Southern Florida and New Orleans are the first and second choices to be investigated.

Tentative reservations for 1958 provide for the convention and exposition to be held February 17-19 at the Conrad Hilton, Chicago, but final decision depends upon the pending decision by the other two associations as to whether or not they will go to an arrangement with exhibit facilities outside a hotel. There has been mounting pressure on the part of certain associate members of those two organizations for an outside show and it appears that that decision may be reached for 1958.

The 1955 mid-year meeting of the board of directors is scheduled for July 14 and 15 at The Homestead, Hot Springs, Va. In 1956, this summer meeting will be changed to another location and the Lake Placid Club, in New York State, is to be investigated.

President T. C. Cooke presided for the first general session which heard reports on business conditions and

those of the staff, the election report and a talk about the highway construction program for the future. Mr. Cooke paid respects to Otho M. Graves and outlined the highlights of the program. Administrative director J. R. Boyd confined his report to referring to the many letters and administrative reports sent out through the year from his office, in the interests of time, having presented a lengthy report previously to the board.

Program

G. D. Lott, Jr. and J. V. Owens each presided over one of the operating sessions; and Wilson P. Foss, III, O. E. Benson and Russell Rarey presided for the other sessions. G. A. Austin presided for the Greeting Luncheon, T. W. Jones, chairman of the Cement and Quarry Section, National Safety Council at the general luncheon where safety awards were presented and president Cooke for the annual banquet. Meetings of the boards of directors of N.C.S.A. and the Manufacturing Division were held February 6.

Each morning session started with the showing of a film. The sound color moving picture, "Give Yourself The Green Light," provided by courtesy of General Motors Corp., dramatized the critical need for roads and highways and gave examples of what has already been accomplished to show progress made and how the job of alleviating traffic congestion may be done. This film is suitable for showing to groups at the local level and is available for only the cost of handling.

"It's Everybody's Business" is the title of a sound color moving picture shown. It was written and produced for the U. S. Chamber of Commerce in cooperation with E. I. du Pont de Nemours & Co., Inc., and was a fascinating portrayal of how free enterprise has developed the U. S. economy. It is designed to correct misunderstandings about business. Prints may be purchased or rented from local or state Chambers of Commerce or from the U. S. Chamber of Commerce.

Board of directors of the N.C.S.A. meeting the day before the convention

The third colored film, "Expressway to Columbus," was presented by Fred E. Swineford, engineer-director, Macadam Pavements, Inc., Columbus, Ohio. It described a 4-lane macadam base bituminous concrete pavement in the Columbus area, featuring construction and new developments in macadam road machinery.

An informal talk of a lighter vein presented at a business session was entitled "Crises Still Make Our Foreign Policy" by W. G. Hetherington, News Analyst and Foreign Correspondent, *The Newark News* and Foreign Radio Reporter for NBC and ABC. Mr. Hetherington's talk was on the morning that Malenkov was deposed as head of the Russian government. He said in substance that we were very close to war but that the American people now have a new confidence in the White House and must continue to have faith.

The talk, "My Life as a Spy," by Countess Maria Pulaski at the Greeting Luncheon turned out to be a startling surprise and one which we will not disclose herein, lest we jeopardize the effectiveness of the talk should it be given before other groups in the rock products industries.

There were two humorous and highly entertaining talks, at the general luncheon and the banquet. One was

Business luncheon of the Manufacturing Division

"The Sunny Side of Main Street" by Hon. Harold Caldwell Kessinger, Inspirational Humorist, Ridgewood, N. J., and the second was "Skulduggery at the Old Crossroads" by Art Briese, Hot Springs, Ark., who is called America's Knight of Satire.

Resolutions

Fitting tribute was paid Otho M. Graves (deceased) in a resolution presented the convention by N. E. Kelb. Mr. Graves was credited with bringing the association headquarters from Ohio to Washington, D. C. and with instigating the engineering division of the association. He travelled widely over the country in the early years of the association in the solicitation of support for the organization.

He served N.C.S.A. as president from 1925 through 1928 and had been chairman of the convention program committee for many years. A. L. Worthen has now assumed that responsibility. Mr. Kelb called attention to the articles about Mr. Graves by Nathan C. Rockwood in the December, 1954, issue of ROCK PRODUCTS and in the N.C.S.A. Journal.

Other resolutions expressed appreciation to the staff for its good work and a special tribute was paid chairman C. A. Gustafson of the accident prevention committee for having done more work than any single individual in the interest of safety.

Social Events

Among social events were a Gay Nineties Party which provided dinner, entertainment and dancing, and the annual reception and banquet.

An outstanding program was provided for the ladies. It started with a get-together tea and, each day, morning coffee was served in the ladies' special headquarters. There was a special ladies' luncheon at the White House Inn, Covington, Ky., which featured a fashion commentator. Other events included the convention social functions and the special luncheons which had entertaining speakers. Mrs. T. C. Cooke, Mrs. H. H. Brandon, Mrs. V. C. Morgan, Mrs. B. R. Maloney and Mrs. Russell Rarey were hostesses, and Mrs. Billie Bischoff was director of entertainment.

Officers

T. C. Cooke, president, Lynn Sand and Stone Co., Swampscott, Mass., was re-elected president of N.C.S.A. James Savage, treasurer; J. R. Boyd, administrative director and secretary; A. T. Goldbeck, engineering director; and J. E. Gray, field engineer were re-elected.

Elected to the executive committee were O. E. Benson, General Crushed Stone Co., Easton, Penn.; H. A. Clark, Consumers Co., Chicago, Ill.; G. D. Lott, Jr., Palmetto Quarries Co., Columbia, S. C.; A. W. McThenia, Acme Limestone Co., Fort Spring, W. Va.; J. V. Owens, Eastern Rock Products, Inc., Utica, N. Y.; and W. C. Rowe, Rowe Contracting Co., Malden, Mass. Russell Rarey, Marble Cliff Quarries Co., Columbus, Ohio, was elected as the past president member of the executive committee. Ex-officio members are T. C. Cooke; H. C. Krause, Columbia Quarry Co. as immediate past president; and B. R. Maloney, E. I. du Pont de Nemours & Co., chairman of the Manufacturing Division.

Regional vice-presidents are W. C. Rowe (New England); B. S. Campbell, Harry T. Campbell Sons' Corp., Towson, Md. (Eastern); A. W. McThenia (Central); L. J. Boxley, Blue Ridge Stone Corp., Roanoke, Va. (Southeastern); A. J. Cayia, Inland Lime and Stone Co., Manistique, Mich. (Northern); W. A. Clark (Midwestern); Houston Clinton, Houston Clinton & Co., Burnet, Texas (Southwestern); B. G. Woolpert, Granite Rock Co., Watsonville, Calif. (Western); and R. G. L. Harstone, Canada Crushed & Cut Stone Ltd., Hamilton, Ontario, Canada (British Commonwealth).

H. E. Rodes, Stirling Tomkins and Harold Williams were re-elected honorary members of the board. No one was elected honorary member of the executive committee to succeed Otho M. Graves, (deceased).

Manufacturers Division

B. R. Maloney, E. I. du Pont de Nemours & Co., New York, N. Y., was re-elected chairman of the Manufacturers Division at the luncheon business meeting.

L. A. Eiben, Northern Blower Co., Cleveland, Ohio; Wayne W. King, W. S. Tyler Co., Cleveland, Ohio; and R. D. Ketner, General Electric Co., Schenectady, N. Y., were re-elected vice-chairmen. B. R. Maloney, R. P. Ketner and I. F. Deister, Deister Machine Co., Fort Wayne, Ind., are representatives of the Division to serve on the N.C.S.A. board of directors.

Newly elected board members are H. M. Albers, Kensington Steel Co., Chicago, Ill.; F. A. Pampel, Chain-Belt

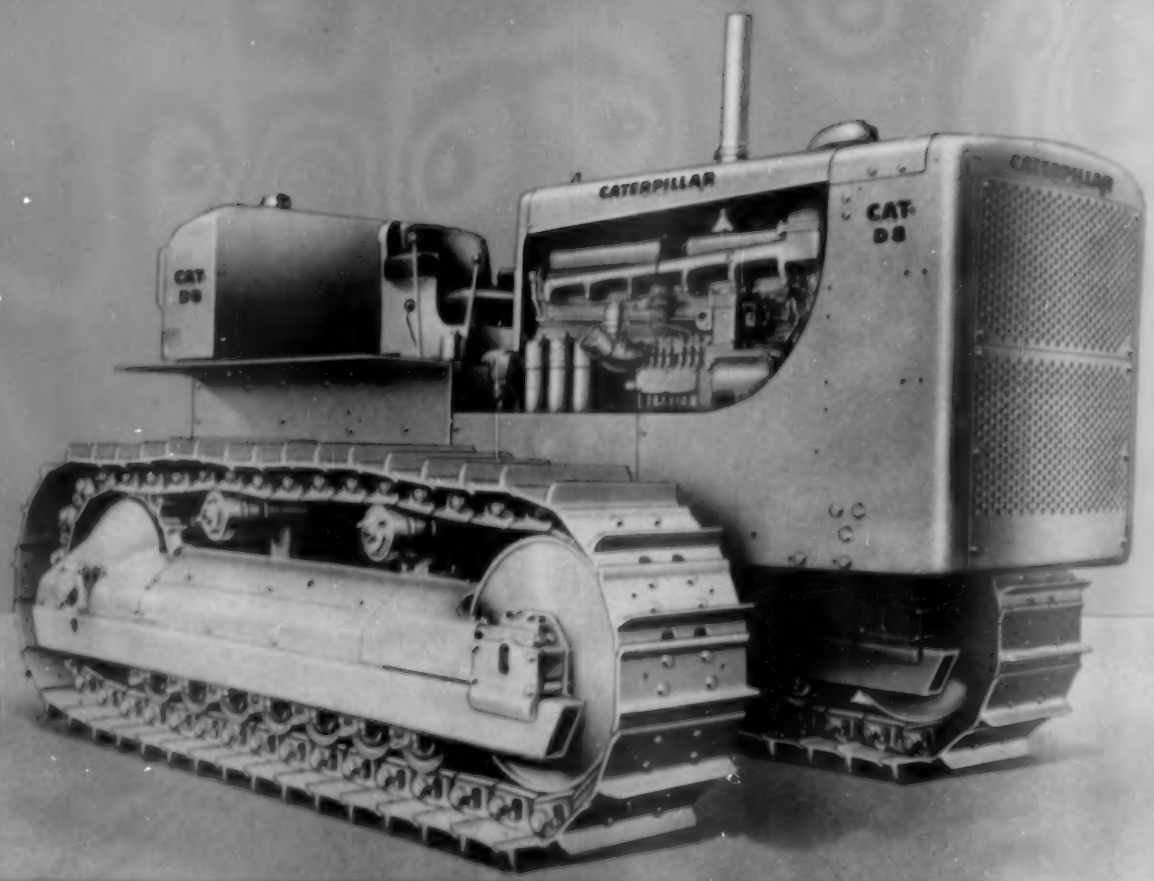
(Continued on page 105)

Manufacturers Division, Board of Directors. Top row, left to right: G. C. Holton, American Cyanamid Co.; W. A. Rundquist, Pioneer Engineering Works, Inc.; Gilfry Ward, American Manganese Steel Div., American Brake Shoe Co.; G. H. Keppel, Birdsboro-Buchanan Crusher Dept., Birdsboro Steel Foundry and Machine Co.; Richard Herold, Taylor-Wharton Iron & Steel Co.; and J. W. Hardesty, Baldwin-Lima-Hamilton Corp. **Middle row, left to right:** C. Dorrell Smith, Joy Manufacturing Co.; H. M. Albers, Kensington Steel Co.; R. M. Dickey, Bucyrus-Erie Co.; H. W. Newton, Barber-Greene Co.; and J. M. Hume, Pettibone Mulliken Corp. **Bottom row, left to right:** J. R. Boyd, administrative director, N.C.S.A.; B. R. Maloney, E. I. du Pont de Nemours & Co.; Mrs. E. S. Gill, Gill Rock Drill Co.; R. D. Ketner, General Electric Co.; L. A. Eiben, Northern Blower Co.; I. F. Deister, Deister Machine Co.; and L. A. Rhodes, Jeffrey Manufacturing Co.

NEW

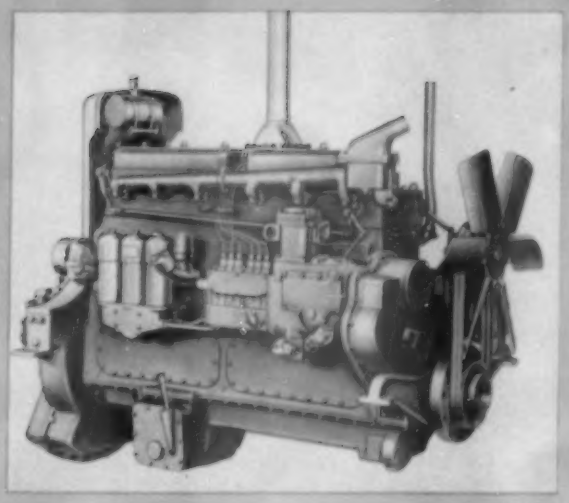
CATERPILLAR ANNOUNCES THE NEW D8

SERIES D and SERIES E

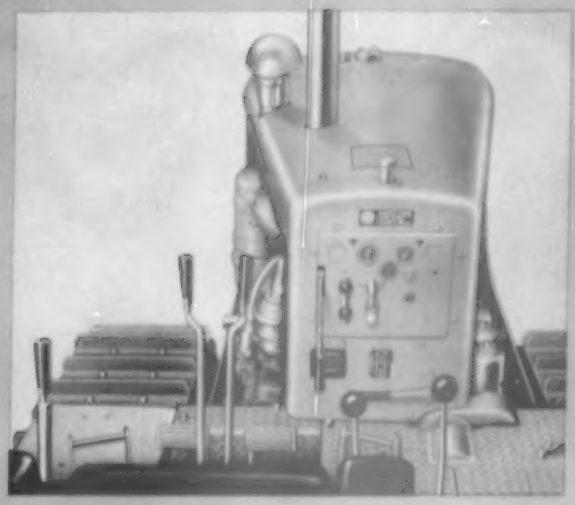


Choice of TORQUE CONVERTER or DIRECT DRIVE

You're looking at a major advance in tractor design—the new Caterpillar D8 Tractor. While it still bears the name of the unit that earned world-wide recognition as "boss of the crawlers," it is basically a *new* machine with 155 HP at the drawbar and your choice of torque converter (Series D) or direct drive (Series E). From its new 7-roller track frame to its new 191-HP, 1200-r.p.m. engine, it is built to deliver an even higher standard of money-making production on *any* track-type tractor application in *any* field. Along with its advance-design features, it retains such outstanding Caterpillar exclusives as the oil clutch and certain other job-proved developments. As a result, you can figure on it for *more* work at *lower* cost with *less* down time on *any* job. For complete information about the new, heavy-duty D8 Series D and Series E, see your nearby Caterpillar Dealer.

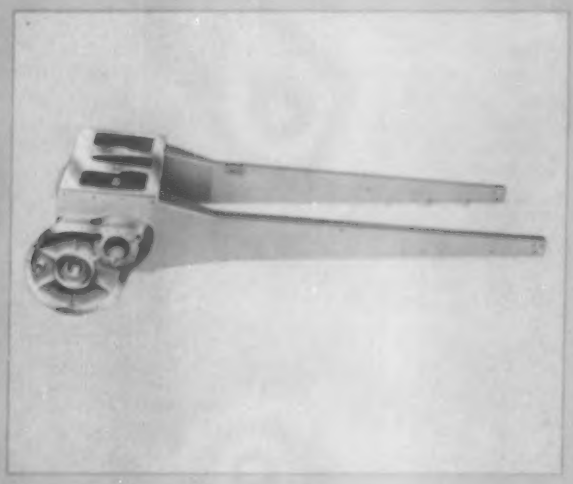


NEW ENGINE, with new fuel injection system incorporating capsule-type injection valves. Flanged center main bearing to take crankshaft thrust. "Hi-Electro" hardened timing gear integral with crankshaft.



NEW EASY-WORKING CONTROLS handy to comfortable, one-man seat. The new streamlined hood affords greater visibility. The new easy-to-see instrument panel is attached direct to engine.

NEW "LIVE SHAFT" DRIVE, independent of flywheel clutch. This important new feature provides constant power for rear-mounted cable controls or other equipment.



NEW WELDED ONE-PIECE STEERING CLUTCH CASE—main frame assembly for a stronger "backbone." Transmission and steering clutches can be removed without disturbing other parts.

NEW OPTIONAL DRIVE, torque converter or direct drive, whichever is best for your job. *Torque converter:* torque multiplication of 5 to 1 gives smooth operation in each speed range. 3 forward and 3 reverse: low 0 to 3.6 m.p.h.; intermediate 0 to 5.3 m.p.h.; high 0 to 7.4 m.p.h. *Direct drive:* 5 speeds forward and 3 reverse.

NEW 7-ROLLER TRACK FRAME for greater stability, flotation and better ride.

NEW "WATER-QUENCHED" TRACK SHOES for longer life than ever before.

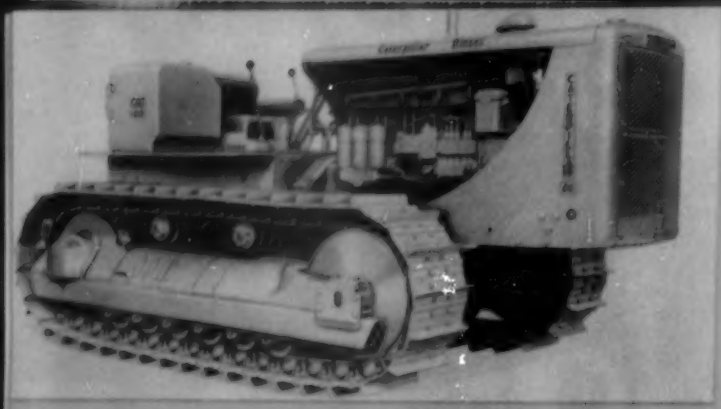
NEW HYDRAULIC BOOSTER STEERING, pump drive direct from engine, independent of flywheel clutch, for maximum steering ease.

NEW STARTING ENGINE with more power for faster, surer starts in any weather.

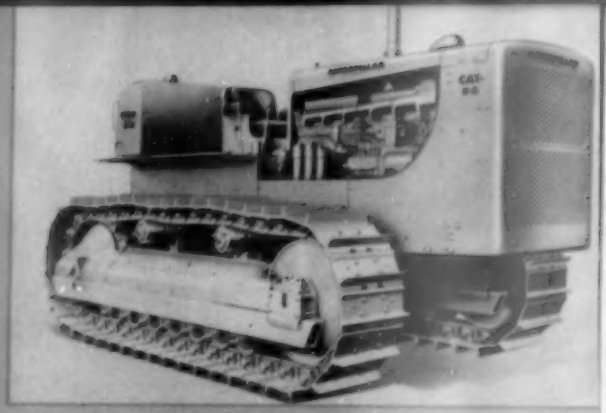
NEW "IN-SEAT" STARTING for greater convenience.

NEW 118-GALLON FUEL TANK, enough for normal 12-hour operation.

NEW ATTACHMENTS include cable controls—the new rear-mounted double drum No. 29 with constant power drive direct from engine, and the new front single drum No. 30. New, larger No. 8A and No. 8S Bulldozers, both cable and hydraulic controlled, are also available. The new No. 8U "U" blade 'dozer has extra strength. Cable-controlled 'dozers use a 6-part line for greater lifting power. All equipment used on the D8 can be used on the new D8 Series D and Series E.



The D8



The NEW D8 Series D and Series E

CHECK THE DIFFERENCE ADVANCE DESIGN MAKES BETWEEN THE D8 AND THE NEW D8 Series D and Series E

	D8	D8 Series D with torque converter	D8 Series E with direct drive
Operating Weight	38,155 lb.	41,265 lb.	40,430 lb.
Ground Clearance	10½ in.	13 in.	13 in.
No. Track Rollers	6	7	7
No. Track Shoes	39	42	42
Length of Track on Ground	99¾ in.	111¾ in.	111¾ in.
Area Ground Contact 22-in. Shoe	4389 sq. in.	4917 sq. in.	4917 sq. in.
Fuel Tank Capacity	98 gal.	118 gal.	118 gal.
Drawbar	Swinging	Fixed	Fixed
Drawbar Pin Size	1⅜ in. dia.	2¼ in. dia.	2¼ in. dia.
Steering Clutch	Over center spring booster	Hydraulic booster	Hydraulic booster
Steering Clutch Case	Cast iron. Integral with transmission case.	Steel fabricated. Separate from transmission case.	Steel fabricated. Separate from transmission case.
Transmission Case	Cast iron. Integral with steering clutch case.	Cast iron barrel. Separate from steering clutch case.	Cast iron barrel. Separate from steering clutch case.
Main Frame	Box section bolted to cast case.	Box section welded to steel case.	Box section welded to steel case.

Production-wise and profit-wise, you have a new yardstick of performance in the CAT* D8 Series D and Series E. Your Caterpillar Dealer, source of prompt service, will be glad to show you how this rugged new yellow machine can pay off for you!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

Please send me additional information on the D8 Series D and Series E.

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

The new D8 Tractor —another example of CATERPILLAR LEADERSHIP in action

PRINTED IN U. S. A.

Co., Milwaukee, Wis.; and Richard Herold, Taylor-Wharton Iron and Steel Co., High Bridge, N. J.

New members of the Division are Dustex Corp., Buffalo, N. Y.; J. W. Burress, Roanoke, Va.; Link-Belt Speeder Corp., Cedar Rapids, Iowa; Lippman Engineering Works, Milwaukee, Wis.; and Dart Truck Co., Kansas City, Mo.

Most of the discussion was about plans for future expositions inasmuch as there is indication that the arrangement with the National Sand and Gravel Association and National Ready Mixed Concrete Association may be terminated starting in 1958.

Appropriate resolutions were passed on deaths of R. F. Feind, Fennell Berger, Ralph Hunt and Otho M. Graves.

Engineering Director's Report

ENGINEERING DIRECTOR A. T. GOLDBECK'S REPORT differed from the usual type and was concerned wholly with an appraisal of the capability of the road-building industry to complete a $101 billion highway program during a 10-year period. The estimates in his report were developed by the task forces of the American Road Builders' Association.

Mr. Goldbeck served as chairman of the task force on materials and supplies. Other groups considered matters of planning and design, construction and construction machinery and equipment. The general conclusion after careful appraisal is that the highway building industry is capable of undertaking a $101 billion highway program in a 10-yr. period. It is recognized that there may be minor and regional shortages at the beginning but that all of the industries concerned have, or will have, expansion programs where needed.

The normal current construction year is about $4 billion including $3.5 billion for actual construction. In addition, it is assumed that the $2 billion now spent for annual maintenance will remain about constant. During the first year of the accelerated program, the normal $4 billion would be increased to $6 billion; to $8 billion during the second year; $10 billion the third year, $11 billion the fourth year and continuing at that level through the tenth year.

Deficiencies in highways are distributed as 36 percent in urban expressways and local city streets, 33 percent in primary rural roads and 31 percent in secondary and other local rural roads. The backlog of plans now available is estimated to be sufficient for $6 billion worth of highway construction and this is augmented by $10 billion worth of toll road projects under construction or in development. Immediate development of a large backlog of plans is necessary.

Bureau of Mines reports indicate that 724,830,000 tons of crushed stone, sand and gravel, and slag were produced in 1952 exclusive of rip rap or refractory stone. Of this total 62 percent, or 452,361,000 tons, were utilized for highways comprising 255,361,000 tons of sand and gravel, 181,000,000 tons of crushed stone and 16,000,000 tons of slag. Total highway consumption of aggregates was estimated at 502 million tons in 1954 of which 357 million tons was for construction and the balance for maintenance.

Maximum requirement for an $11 billion program is 892,356,000 tons which is 535,116,000 tons, or 150 percent, in excess of the 1954 requirement. This would indicate that the aggregate industries would have to expand their production of highway aggregates by 150 percent within a 4-year period if the program is to proceed on schedule. Since maximum demand for aggregates would not have to be met before the fourth year, the industry would have time to plan and expand to meet the needs.

Production of aggregates could be increased by 324 million tons with relatively little expansion of existing facilities. Production at a higher rate, said Mr. Goldbeck, will require the installation of additional equipment and the opening of additional deposits. Equipment for such expansion is expected to be available.

Portland cement likely would be in short supply in certain regions if production is not expanded, said Mr. Goldbeck. Current rate of use for highway construction is 50 million bbl., exclusive of precast products such as culverts, and would have to be increased to 160 million bbl. in the fourth year. Regional requirements of the New England-New York area and in Michigan, Illinois, Indiana, Kentucky and Wisconsin area would consume the entire current cement production capacity.

Assuming that increased production is possible from present plants and that 20 million bbl. will be added from increases now planned, an added 80 million bbl. of productive capacity will be needed for the peak years if consumption by non-highway users remains at present levels. Current indications, according to Mr. Goldbeck, are that cement manufacturers will increase production capacity to 407 million bbl. per year by 1959 which would be adequate.

Basic steel supply is not a problem but considerable expansion will be necessary for producing wire fabric, wire mesh and bar mats. Additional steam curing equipment may be needed for concrete pipe manufacture.

In 1954, highway contractors operated at only 46.4 percent of capacity and they could support a maximum highway program of $7.4 billion in one year with their present facilities.

The construction machinery industry now has or can provide sufficient capacity to meet the peaks anticipated and fill all other normal needs.

Business Conditions

A SUMMARY OF REPORTS submitted by the nine regional vice-presidents on business conditions during 1954 and the outlook for 1955 was presented by president T. C. Cooke.

There were extremes over the country in reports of how volume of crushed stone business during 1954 compared with 1953. Greatest improvement was in Canada and the midwestern region which were up about 5 percent. The worst condition was a drop of 20 percent in the southwestern region. Volume of business for the country as a whole was about the same as in 1953.

Prices in 1954 remained at 1953 levels in most regions which does not reflect increases in costs. The one exception was the southwestern region where prices declined more than 10 percent.

There was apparently an excess of productive capacity in most parts of the country. The western region operated at near capacity, but producers through the southwestern region operated at about 50 percent of capacity. For the country as a whole, the demand for crushed stone required about 80 percent of the existing plant capacity.

As far as the percentage distribution by markets is concerned, the summary indicated that the largest single outlet for crushed stone is highway work. Except for the special purpose plants, the highway outlet varied in 1954 from 46 percent to 71 percent with a mean of 60 percent. Second largest outlet for the average crushed stone plant is in the building industry which averages about 20 percent.

Ballast sales have declined to about eight percent. Over the years, railroad

(Continued on page 108)

Now! "Self-Serve" Operation - Bailey Meter

Your "Self-Serve" Bailey controlled rotary kiln literally thinks for itself and reacts quickly and correctly to any changes in operating conditions. You get:

1. **Economical Operation**—*Gives maximum production from every unit of fuel you burn* because Bailey Combustion Control closely guards Fuel-Air Ratio, Hood Draft, Fuel Feed, Clinker Cooling and Temperature of Air for Combustion.

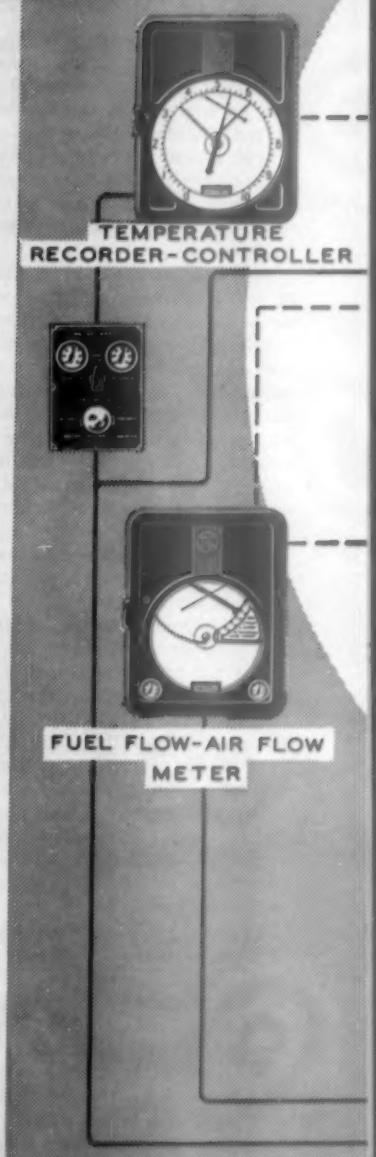
2. **Uniform High Quality of Product**—Accurate measurement and control of Kiln Speed, Burning Zone Temperature, Combustibles Content and Oxygen Content . . . *for a high grade product, consistently.*

3. **Minimum Maintenance**—Uniform excess air conditions and constant temperatures *prolong the life of your kiln.* Costly refractory repairs and wear and tear on auxiliary equipment are reduced to a minimum.

The accompanying diagram shows one way in which Bailey instruments and controls can give you a "Self-Serve" Kiln. Other arrangements to suit the requirements of any rotary kiln are available.

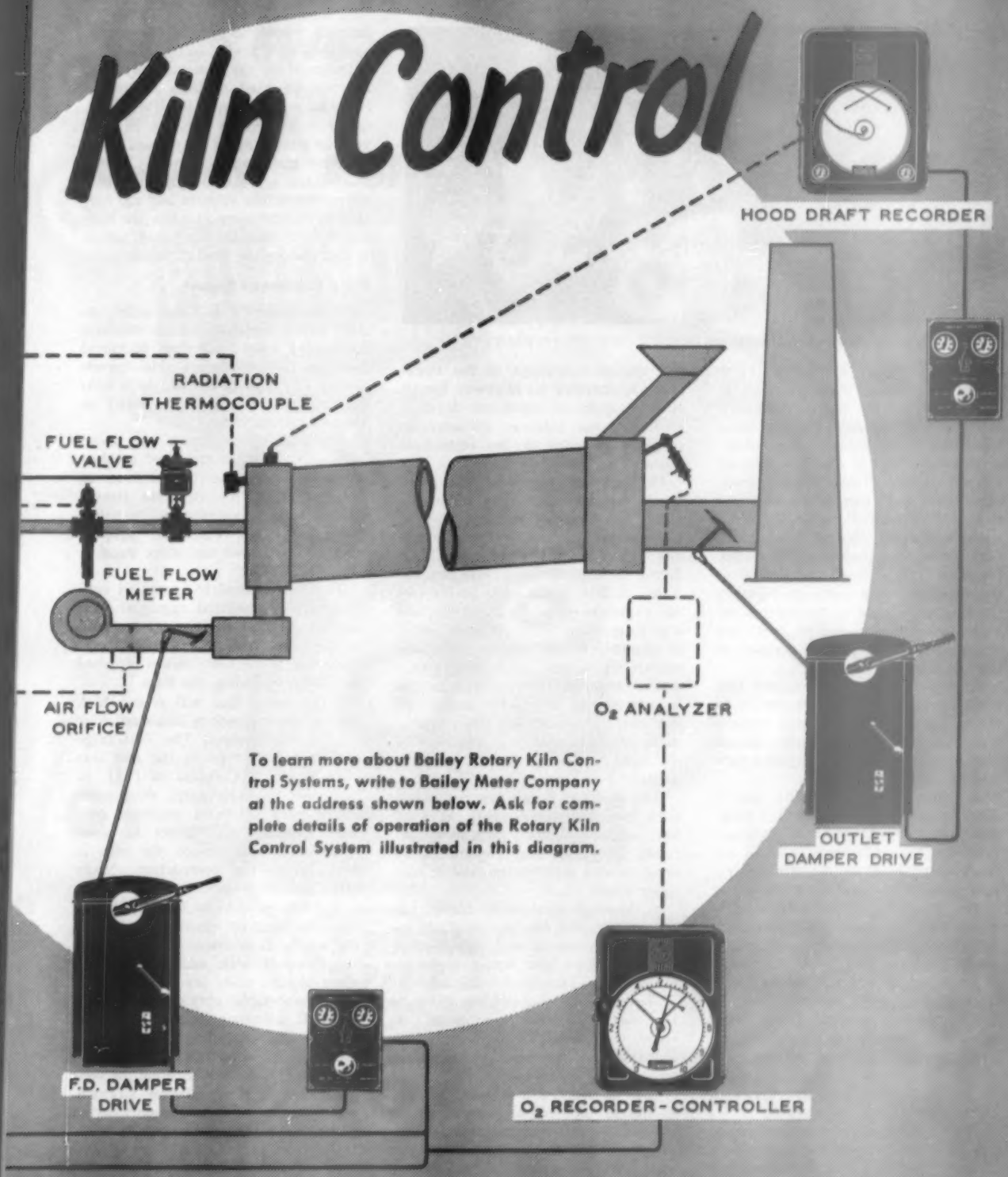
Bailey Meter Company maintains a staff of engineers who are experts in the control of rotary kilns. Let one of these men help plan a control system to give you a "Self-Serve" rotary kiln.

P-23



Bailey Meter Company

Kiln Control



To learn more about Bailey Rotary Kiln Control Systems, write to Bailey Meter Company at the address shown below. Ask for complete details of operation of the Rotary Kiln Control System illustrated in this diagram.

Meters and Control Systems for Process Plants

IVANHOE ROAD • CLEVELAND 10, OHIO

Bailey Meter Company Limited · Montreal

Ladies were entertained at luncheon at White Horse Inn, Covington, Ky.

ballast had always accounted for a greater percentage than the current rate. Chemical sales ranged from zero to 90 percent with an average of some 5 percent for the industry. Agricultural limestone also is representative of about 5 percent of sales. Riprap, granules, fillers and other minor uses add to only 2 percent of the total.

No significant change in this distribution is expected in 1955 except for two regions. A gain in ballast at the expense of a drop in highway stone is anticipated in the eastern region. Highway and ballast stone are expected to be in greater demand in the midwest.

Producers as a whole expect that 1955 business will be quite similar to 1954. The average producer expects a modest increase in business whereas New England producers expect a substantial improvement.

According to the reports several new crushed stone plants were completed in 1954 or put under construction. The fact that most of them are in areas where there already is excessive productive capacity is disturbing in Mr. Cooke's opinion. An increasing number of stationary plant producers are complaining about competition from "gypsy" plants.

Demand for crushed stone is expected to be good, on the whole, in 1955 but keen competition will make the selling effort more difficult. Many producers are installing additional capacity for producing the small sizes of crushed stone and this trend is quite general over the country.

High freight rates are contracting the sales area for some producers. It is hoped that the railroads will awaken to the fact that they have responsibility for creating a larger trucking industry and increasing the number of portable operations.

Highway Needs

Pyke Johnson, chairman of the subcommittee on highway development of the U. S. Chamber of Commerce and special consultant to the President's Committee on Highway Development, spoke on significant developments in the highway construction program required in the immediate future.

He spoke mainly about the president's program that $101 billion be spent for highway building over a 10-year period and presented facts and figures to justify the need. That figure, he said, would require expenditures of $54 billion over and above the expected normal $47 billion and was determined from 20 years' effort in assembling data. The program represents the largest peace-time public works undertaking in world history by any nation. It has the support of the state governors and the endorsement of those who are informed of the need and scope of the program according to Mr. Johnson.

The program is not just concerned with transcontinental roads, he said, but would include farm-to-market roads, by-passes and encompass all types needed to fulfill the goal of adequate roads.

A thorough nation-wide survey has been made and the president's committee has come up with definite conclusions. More and better highways are considered essential to the national economy, to national defense and public safety. One-third the share of cost would be assumed by the federal government and two-thirds by the states and affected localities.

It is considered a primary responsibility of the federal government to develop the 40,000 miles of trans-continental roads which inter-connect the state capitals and the majority of the largest cities.

The program calls for a bond issue of $25 billion which, within a 10-year period, would result in primary interstate highways to meet the traffic expected in 1974. An additional $4 billion is recommended for urban interconnecting routes. Toll roads would be linked with the interstate roads and a formula would be applied for equity payments to states with such roads.

Other than the interstate system, the rate of road building would be based on traffic expected in 1965. The figure is 81 million vehicles by that year as compared to 58 million vehicles now traveling the roads.

Mr. Johnson mentioned the great movement to the suburbs and the fact that more and more families are having two automobiles as a result, which is aggravating the road problem.

Field Engineer's Report

Field engineer J. E. Gray, in his annual report, summarized his activities in helping solve individual technical problems of producers. He travels widely and most of the problems confronted have reference to quality or use of crushed stone.

The bulk of his report was about trends in the construction of crushed stone base courses and selling of crushed stone for concrete having specifications requiring a specified flexural strength. These two subjects may involve more and more producers in the future.

There is a trend to increased construction of stabilized aggregate base courses of types that have been built in the west. In most cases the aggregate has been 1-in. minus crushed limestone, including the fines.

A gradation that will give a high density and a plasticity index not over 6 is a requirement. The first large project of this type in the east was built in North Carolina in 1951. In this case the aggregates were plant mixed with optimum moisture content. Delivery was direct to stone spreaders which placed the mix in 5-in. layers for compaction. Many other similar projects have followed.

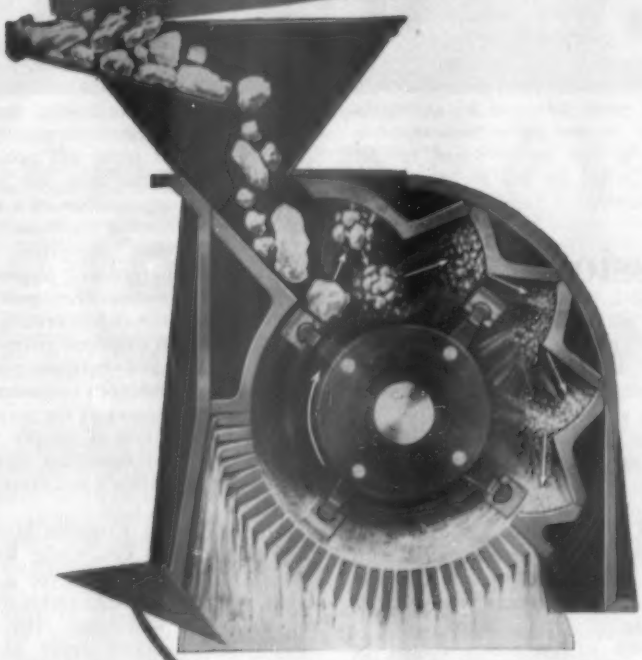
Projects have to be large to justify the investment for mixing plants. Since the aggregate is essentially a crusher-run product with added fines, and since hauling costs are high, portable or semi-portable plants have advantages. In densely-populated areas, the water-bound macadam base is probably best for economic reasons.

In supplying crushed stone for concrete specified by flexural strength, Mr. Gray said that it was part of the producers' selling job to supply information on required cement factors. This will help contractors to select aggregates which will yield the required strength with the lowest cement factor. Thus, a crushed stone salesman must be ready to show that use of his product will yield the most economical concrete.

This will involve considerations of the strength-cement factor relationship and setting up of reasonable allow-

These Five *Pulverator* Features Help REDUCE AGLIME COSTS

PULVERATOR Hammermills



1. SQUARE HIT

A square hit is the most powerful breaking blow. *Pulverator* hammermills are designed to utilize this important principle of impact crushing. Feed is hit squarely by flat hammers.

2. MULTI-IMPACT

Hammers break and repeatedly smash the material squarely against involute breakers—resulting in a minimum of wear on breaker plates. *Pulverators* may be operated with or without grate bars and at various speeds.

3. HIGH PRODUCTION

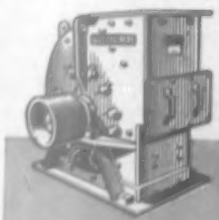
The multi-impact principle produces more fines ahead of the grate bar section. With more fines passing the grate, you get high production at lower cost. Also — power requirement and maintenance are reduced.

4. QUALITY PRODUCT

Pulverator hammermills break material into a uniformly distributed cubical product. The product analysis can be varied by changing grate bar spacing and operating speed.

5. RENEWABLE PARTS

Liners, breaker plates, hammers, hammer pins and individual grate bars can be replaced separately. Hammers and grate bars are reversible.



Pulverator hammermills are built in five sizes, capacities 2½ to 160 tph. Get more facts from the A-C representative in your area, or write for *Pulverator* Bulletin 07B6265A. Allis-Chalmers, Milwaukee 1, Wis.

A-4032

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Pulverator is an Allis-Chalmers trademark.

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Vibrating Screens | Jaw Crushers | Gyratory Crushers | Grinding Mills | Kilns, Coolers, Dryers

ance for job variations to guarantee that specifications will be met.

Mr. Gray showed strength-cement factor curves for two acceptable quality course aggregates to emphasize the significant differences in cement factor that may be required for any given strength. The curves showed that where the strength-cement factor relationship may be close in the lower ranges, they may differ widely in the upper ranges as the properties of the coarse aggregate come more into action.

He pointed to the danger in applying the principle that flexural strength is about one-sixth of compressive strength. There may be great deviations over differing ranges of compressive strength and it is recommended that concrete beam tests be made in order to obtain safe figures.

Turning from the discussion of laboratory tests to the problem of field performance, Mr. Gray mentioned that changing brands of cements, variations in gradation and consistency, and variations in temperature and curing would affect the strength of concrete. Because of these variables, it becomes necessary to design the concrete for a higher strength than specifications require.

Mr. Gray discussed the matter of over-design at length and, for purpose of discussion, referred to the study of coefficients of variation presented by Stanton Walker before the 1944 convention of the National Ready Mixed Concrete Association. The term "coefficient of variations" is the standard deviation expressed in percent and is a measure of the uniformity in strength tests for concrete from a given plant.

Mr. Gray gave some examples and tabular data were presented for calculating the amount of "over-design" needed to obtain the required average strength dependent upon different conditions of probability and coefficients of variation.

In conclusion, he advised that a crushed stone salesman be extremely cautious in making statements with respect to the performance of his product when he has no control of the concrete.

Operating Sessions

ONE OF THE TWO OPERATING SESSIONS was devoted almost entirely to the subject of maintenance. It started with the showing of a sound-color film "Productive Maintenance" presented by courtesy of General Electric Co. and introduced by Harrison Beale.

Mr. Beale told of the great increases in power utilization in industry over the years in relation to man-hours of employment and how industrial production will far outstrip the rate of population growth in the years ahead. There will be less labor available per unit of output as a result and stress will be on mechanization at an unprecedented rate.

Modern high production methods will soon become out-of-date, said Mr. Beale, and the more complex machinery to come will require more dependence on maintenance skills. Maintenance cost will increase percentage-wise in the effort to reduce downtime since losses due to unscheduled downtime will become increasingly serious. Cost of maintenance, itself, will also command increased attention. Within the next few years, Mr. Beale said that maintenance will play more of a part in whether or not a company is making progress. It must then be justified on the same basis as operating costs now are.

The film was designed to show how plant production can be increased by more effective use of maintenance on a planned basis to reduce breakdowns and the length of downtime. An industrial plant was used as illustration.

When putting maintenance on a planned basis, name plate data on each piece of equipment are recorded as well as the age of equipment in working up guide records. Unusual service conditions are noted in order to select frequency of inspections. A determination of renewal parts needed in stock is made based upon experience and service conditions. A card system should be devised for each unit of equipment and a renewal parts file made.

Records of inspection should be maintained and special note be made of vital equipment. Overhaul dates would be scheduled well ahead of failure of vital equipment and this would be on a regular schedule.

A chart was shown to emphasize the substantial savings in down-time cost, repair cost and hours saved resulting if provision be made for adequate inventory of replacement and repair parts.

In summary, a planned maintenance program would comprise the development of all information available on the equipment, evaluation for routine maintenance, the establishment of a routine operating control system, evaluation of equipment for "critical" maintenance, the establishment of a critical maintenance program including scheduled overhauls and the stocking of critical parts. General Electric Co. has a kit available with literature on the subject of maintenance.

Discussion of the subject of maintenance followed, led by three producers who have emphasized production maintenance in their plant operations.

Montagu Hankin, Jr., North Jersey Quarry Co., Summit, N. J., described the maintenance program organized late in 1954 by his company. Several trap rock plants and three blacktop plants are operated by this company all within a 20-mile radius of Summit. Operations are de-centralized with a division manager at each plant. Due to weather, practice is to operate until the end of December and to shut down until early March of each year.

In the past, said Mr. Hankin, emphasis has been on production, and maintenance has been left to the discretion of the individual superintendent and foremen. Accordingly, repairs were left for winter overhaul.

A study made in 1954 revealed that labor costs were increasing sharply. This fact, coupled with greatly increased costs of parts and operating materials over the last ten years, prompted the organization of a maintenance department at the home office.

The department comprises three men who are charged with responsibility for maintenance. They make inspections, recommend operating procedures, suggest required inventories and spare parts and shutdown periods. Their recommendations are submitted to the division managers for comment and required action is usually taken immediately. An operating clerk at each plant maintains a machinery history.

Marvin Nelson, Concrete Materials and Construction Co., Cedar Rapids, Iowa, discussed practices for a company with five portable plants as well as stationary operations. The same maintenance policies apply to both types of plants, differing only in details.

Emphasis is on standardization of equipment for interchangeability and having standby equipment available, with adequate repair shop facilities. Should a power unit start to use oil, for example, it is replaced immediately and overhauled without the need for rushing the job.

The primary crusher being a critical unit, a complete spare assembly is kept on hand which can be installed in a few hours. Similar practice is followed for secondary crushers, hammermills, air compressors, and smaller power shovels. A central repair shop is considered more efficient than trying to have separate shops at each plant.

As a result of this program, the operating season has been lengthened and the plants no longer have scheduled shutdowns. Greater continuity of

N.C.S.A. 1953 Safety Competition Awards winners. Top row, left to right: Samuel Greenberg, superintendent, Joliet quarry, Lincoln Crushed Stone Co., Joliet, Ill.; J. L. Huff, superintendent, Bedford quarry, Blue Ridge Stone Corp., Bedford, Va.; T. S. A. Rubino, foreman, Cedar Hollow quarry, Warner Co., Devault, Penn.; R. S. Reigeluth, secretary and assistant treasurer, New Haven Trap Rock Co., New Haven, Conn.; R. E. Sansom, manager, crushed stone operations, American Limestone Co., Knoxville, Tenn.; Chas. Bass, superintendent, Plainville No. 4 quarry, New Haven Trap Rock Co., Plainville, Conn.; and Jesse Haney, superintendent, Prospect Stone Plant No. 6 quarry, Eastern Rock Products, Inc., Prospect, N. Y. **Middle row, left to right:** W. J. B. Houser, superintendent, Bakerton Mine, Standard Lime & Stone Co., Bakerton, W. Va.; G. C. Larkin, superintendent, Kimballton mine, Standard Lime & Stone Co., Kimballton, Va.; R. C. Williams, superintendent, Red Hill quarry, Standard Lime & Stone Co., North Garden, Va.; J. W. Powell, superintendent, Bakers quarry, Superior Stone Co., Monroe, N. C.; Robert Brewer, superintendent, North Branford No. 7 quarry, New Haven Trap Rock Co., N. Branford, Conn.; Burr Shaver, superintendent, White Haven quarry, General Crushed Stone Co., White Haven, Penn.; and W. A. Dearth, Jr., insurance supervisor, General Crushed Stone Co., Easton, Penn.; **Bottom row, left to right:** Salvatore Simeone, president, Stoughton Crushed Stone Co., Stoughton, Mass.; Geo. T. Latimer, vice-president-operations, Waukesha Lime & Stone Co., Inc., Waukesha, Wis.; J. J. Forbes, director, Bureau of Mines, Department of Interior, Washington, D. C.; C. H. Wolfe, president, Greystone Granite Quarries, Inc., Henderson, N. C.; E. Z. Cole, superintendent, Rock Hill quarry, General Crushed Stone Co., Quakertown, Penn.; and John P. Cox, superintendent, Watertown quarry, General Crushed Stone Co., Watertown, N. Y.

employment has been provided and working conditions for repair men are much better in a central repair shop. Parts are stored in a warehouse.

The plant superintendent has the responsibility at each plant and he in turn answers to a travelling superintendent. A weekly progress report is considered of utmost importance and they are constantly being analyzed. These reports are brief but they contain records of operating hours, length of delays, the identification of units which have failed, reasons for the equipment failure, tonnage produced per day, man-hours, percentage of hours lost and tell the needs for replacement parts.

Maintenance practices in a large granite quarry operating the year-around in processing highly abrasive granite were described by Nelson Severinghaus, Consolidated Quarries Corp., Decatur, Ga.

This stone is so abrasive that the life of crusher jaws is one-third that for an average trap rock, requiring frequent changes. It is necessary to schedule maintenance jobs very carefully and to maintain more parts in stock than the average plant requires. Also, more duplicate units are needed. Duplicate secondary crushers in parallel, for example, permit taking one out of service for repairs while temporarily diverting part of the flow to reduction crushers.

The plant design has provided for adequate capacity of important units to permit flexibility for repair and maintenance. Due to the abrasiveness of the stone, durability is required in all parts. The use of Ni-Hard cast iron for chutes has reduced downtime considerably. Such chutes have five times the life of plain rolled steel.

Adequate surge piles have been provided for to allow continuity of operations, and efficient handling equipment for heavy parts has added to efficiency. For instance, a 2½-cu. yd. crane is used, rather than a hand-chain hoist, for handling heavy primary crusher parts.

A well-equipped shop has been the means of saving much time otherwise lost in the transportation of parts from remote points. Close attention is paid to lubrication and changes. Due to the abrasive dust, a continuous flow of fresh lubricant is supplied the jaw crusher pitman bearing. Close attention is paid to dust seals and practice is to use the best bearings available.

Good maintenance records are kept since maintenance has become a higher percentage of operating costs. The company makes certain that maintenance men are well coached by equipment manufacturers.

Questions developed that maintenance work at this operation is done by operating men over the week-ends whenever possible. No premium rates are paid, by union agreement, other than the normal time and one-half paid for work over 8 hr. a day or over 40 hr. in a week. The life of the pitman bearing for the 48- x 60-in. jaw crusher was three months, and six months for the frame bearings two years ago. Automatic lubrication and dust seals have since tripled their life.

Ultrasonic Inspection

"Ultrasonic Inspection of Quarry Equipment" was the subject of a slide-illustrated talk by John C. Smack, Sperry Products, Inc., Danbury, Conn.

This equipment, called a reflectoscope, was first used by the Republic Steel Co. ten years ago and its first use in the quarry industry has been by New York Trap Rock Corp.

Its application is in the detection of fatigue cracks in heavy equipment such as gyratory shafts, crusher frames and other parts in order to guard against unexpected breakdowns and resulting losses in production and profits.

Application of ultrasonic inspection at regular intervals will not only locate fatigue cracks but record their rate of growth. The existence of such

Accident prevention was discussed in informal meeting. Left to right: H. E. Ranier, Federal Crushed Stone Co., Buffalo, N. Y.; Theodore W. Jones, New Haven Trap Rock Co., New Haven, Conn.; chairman of Cement and Quarry Section, National Safety Council; C. A. Gustafson, chairman N.C.S.A. accident prevention committee; H. H. Kirwin, Eastern Rock Products, Inc., Utica, N. Y.; and administrative director, J. R. Boyd, N.C.S.A.; and Beatrice G. Gay, administrative assistant, on right

cracks and progress in their growth may not indicate that the equipment should be repaired, but serve instead as a guide so that the producer avoid overloads. Also, such testing will indicate when there is need for providing a spare and be a guide for planning replacement.

Mr. Smack described the principle of operation and showed pictures of actual use in plants of New York Trap Rock Corp. and in other industries. Basically, the equipment consists of transmitter and receiver crystals so that vibrations may be put through the metal under examination. Defects upset the beam as transmitted to the receiving crystal and thus show up on a recording chart. The device has been used on both gyratory crusher and jaw shafts and on the take-up shafts of shovels, by New York Trap Rock Corp.

The equipment may be purchased or the testing service may be available from Sperry. Service engineers operate out of many offices located over the country.

Plant Operations

Pictorial presentations were made by four producers to illustrate plant practices that either were unusual or to be emphasized as methods to be used in improvement of operating efficiency.

HAMILTON LOTT, Palmetto Quarries Co., Columbia, S. C., discussed and illustrated the use of a 247-B Eriez metal detector on a main belt conveyor carrying stone from the primary to the secondary crusher.

This device is purely for metal detection and is effective for manganese steel as well as ordinary steel. It consists of a coil encircling the belt, a control cabinet and a marking device. A relay operates the marker and a second one sounds an electric horn but could be arranged to stop the belt.

When metal is detected, red powder drops on the belt near the object and the operator immediately removes the object. The device is equipped to drop up to four doses of red powder if excessive metal is likely to be encountered.

It is important, for best results, that the steel framework not move at the joints and that conveyor idlers be in good condition. It is necessary that the belt be vulcanized rather than tied by metal fasteners. The device is adjustable to detect objects ranging from weight of a hairpin up to large size.

T. C. COOKE, Lynn Sand and Stone Co., Swampscott, Mass., described and illustrated a two-piece drop ball in use by his plant, and the method of assembly.

The ball he uses, when new, weighs 6500 lb. and is swung from a 1½-cu. yd. crane with 60-ft. boom. A 1-in. thickness of Plexiglas mounted on sponge rubber gives the operator good visibility and protection in the cab.

The lower part of the ball is of better steel than the upper part and is about one-fourth the total weight. It is a 4140 chromium-molybdenum steel and weighs about 1600 lb. when new. It is welded to the upper section, which has a 3-in. chamfer.

In attaching the two sections, the machined faces are held toegther and two welding machines and three welders are required. The sections rest on rails so they may be rotated, and $\frac{5}{32}$-in. and then ¼-in. welding rods are used. Uniform heating is necessary and stress is relieved by setting the ball inside a concrete pipe which is packed with hydrated lime. The ball remains in the lime about a week.

H. T. MCILWAIN, Bethlehem Steel Co., showed pictures of the company's Bridgeport, Penn., quarry operation which is an outstanding example of good housekeeping and a plant that has gone to extremes in improving public relations.

The plant is within the city, produces 1½ million tons of crushed stone annually of which 70 percent is flux stone, and has a quarry 80 ft. deep. A new housing development is close by and the company has done all in its power to be a desirable neighbor.

A company-owned seismograph records vibrations from every blast and the measurements are taken between the quarry and the houses. The property is surrounded by cyclone fencing and has been beautified by the planting of trees, shrubbery and grass. A blacktop road with concrete sidewall leads to the plant and a safe platform has been erected at a vantage point so that "sidewalk superintendents" may be privileged to observe the operations.

Bulldozers maintain a clean quarry floor and calcium chloride is spread on the roadways to minimize dust. Among other features are a welfare building, change houses in the quarry, heated concrete pump houses, bins under conveyor transfer points and the use of labor saving equipment such as skip buckets in the plant.

A home-made "jam breaker" ahead of the primary crusher feeder was shown and described by J. V. OWENS, Eastern Rock Products, Inc., Utica, N. Y. At this plant, a 3½-cu. yd. Marion shovel loads into Easton units hauling 18 tons. They dump into a feeder hopper of 40 tons capacity from which the feed into a 36- x 48-in. jaw crusher is over a 48-in. apron feeder inclined and back from the crusher.

The jam breaker is a hydraulically-operated steel arm that is pivoted and comes up out of the back end of the feeder to dislodge stone when it piles up and stops flowing. It is very effective and was built at a cost of $1200.

A new approach was used in the second session of pictorial presentations of operations. Modern methods of scrubbing and rinsing stone, and different methods of dumping quarry trucks had been selected as subjects of general interest. Accordingly, field engineer J. E. Gray, in his travels over the country, had taken moving pictures emphasizing these operations at a number of plants. These pictures and colored slides to show details were presented with comments by Mr. Gray. Detailed comments followed from representatives of the subject companies.

Those covered in the presentation were the following:

Company	Plant
M. J. Grove Lime Co.	Frederick, Md.
Columbia Quarry Co.	Columbia, Ill.
John S. Tester & Son, Inc.	Westminster, Md.
Servtex Materials Co.	New Braunfels, Texas
Camp Concrete Rock Co.	Brooksville, Fla.
Concrete Materials and Construction Co.	Moline, Kans.
Consolidated Quarries Co., Inc.	Lithonia, Ga.

The discussion and pictures covered many features of truck dumping and operation including quarry floor

More Accurate Sizing Of Ground And Pulverized Materials!

ENGINEERED FOR PRECISION CONTROL AND HIGH PRODUCTION

Material to be classified is fed into the top of the machine and drops onto a revolving distributing plate. This distributor is so designed that it sprays the material into a rising air current which entirely surrounds the plate. The finer particles are lifted by the air stream and the coarse particles drop down to the reject spout. Passing up through the separating chamber, the dust-laden air is given a whirling motion between Spinner blades and any remaining oversize particles are precipitated. The separator is adjustable to control the fineness of the finished product with unusual accuracy.

WILLIAMS MECHANICAL AIR SEPARATORS

For Finenesses From 30 to 325 Mesh

- Most efficient mechanical air separator ever developed for classifying ground and pulverized materials, or for removing fines from dry ground materials before classifying.
- Product quality is vastly improved and output considerably increased when operated in closed circuit with virtually any type of mill.
- Will handle with equal efficiency a complete range of products—mineral, chemical and vegetable—from the hardest, most dense limestone and ore to the softest, fluffiest starches and flours.
- Permits coarser settings in grinding equipment thus lengthening equipment life by reducing wear on all moving parts. Power consumption is much lower.
- Extra heavy construction. Equipped with anti-friction bearings encased in dust-proof and moisture-proof housings. All casings are of heavy steel plate construction. Operation is dustless and repair cost is practically nil, since there are no fine sieves to wear out and the heavy construction insures long life.

9 Standard sizes, 2½ to 18-foot diameters — Capacities from 500 lbs. to 75 tons hourly

18-Foot Williams RC Separator being tested at plant before shipment.

Write For Details And Describe Your Operation

WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 ST. LOUIS AVE. • ST. LOUIS 6, MO.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

cleanup, the use of side plates, tire protective shields on rubber-tired dozers, the use of stone feeders ahead of primary crushers, use of dumping hooks, stripping with large earthmovers. Related operations also covered included the use of drop balls and methods for removal of cap rock and overburden.

The section on scrubbing and rinsing of stone showed the use of blade mills, screw washers, log washers, hydroclassifiers and liquid cyclones. Other items include jet piercing at Lithonia, Ga., impact crushing and the use of settling ponds for waste.

Percentage Depletion

The Revenue Act of 1954 is a great improvement over the 1951 law insofar as percentage depletion is concerned, said Russell Rarey, chairman of the N.C.S.A. percentage depletion committee. The 1954 Act as written into law has clarifications in its provisions and is re-assuring since it specifically recognizes the principle of percentage depletion and it reflects the current thinking of the government.

The 1951 law went into definitions of certain stones and was not clear in its meaning. The end use test still prevails. Metallurgical and chemical stone is entitled to 15 percent percentage depletion whereas crushed stone for construction use is established at 5 percent. Agricultural limestone, burned lime and cement are considered as chemical grade products and are entitled to 15 percent. When crushed stone is bid in competition with asphalt rock, it is qualified for 15 percent percentage depletion.

It is hoped, said Mr. Rarey, that the treasury department regulations as issued will follow the text of the 1954 Act. Until the regulations are issued, he urged producers to rely on their tax counsels to work out their taxes and he suggested that any peculiar local tax rulings be sent to the association for study and interpretation.

Quality Concrete

Cooperative efforts by all concerned to improve the quality of concrete construction in New York City was the subject of an excellent talk by Roger H. Corbetta, president, Corbetta Construction Co., Inc. Mr. Corbetta discussed reasons for formation of the Concrete Industry Board of which he is president, and the steps being taken by related interests within this organization to improve the stature of concrete.

His company is a major construction firm in New York City and became concerned at the indifference to quality which was proving harmful to the cause of concrete. The board has the sanction of the A.C.I., A.S.C.E., A.I.A. and other organizations and is composed of representatives of contractors, engineers, aggregates producers, architects, testing laboratories, ready-mixed concrete producers, reinforcing steel suppliers and others.

The plan started when the New York Housing Authority expressed its great concern about the quality and workmanship of concrete. The Authority accused the concrete interests with being indifferent and there was the threat of more competitive materials being used. Some of the complaint was based on test cylinder results.

A meeting was called and it was decided that laboratory personnel were at fault for not conducting their testing properly. They were accused of leaving cylinders in the sun and permitting them to freeze and of throwing green cylinders into trucks, etc. Accordingly, their test results were discredited and the testing laboratories were accused of being derelict. They in turn blamed their accusers.

It was then that the Concrete Industry Board was formed to get at the total problem. Some of the ready-mixed concrete plants were found to be antiquated and operators were challenged for their indifference.

They in turn brought up their problems. Among them were the requirement to handle as many as 25 brands of cement when they had facilities for only four or five. Also, they were being told where to buy their aggregates and were blamed when users added more than prescribed water on the job, etc. The P.C.A. was also called upon in the matter of brand requests and was asked what it could do to improve quality.

Until the board was formed, engineers did not have opportunity to know the caliber of the contractor, the quality of materials or the competency of testing procedure. The tendency was to incorporate wasteful safety factors into design to guard against uncertainties.

The board is a continuing organization, is endorsed and supported and is aiming to be set up as the authority on concrete. Laboratories have agreed to examination by the Cement Reference Bureau of Reclamation and to have committees pass on their performance. Ready-mixed concrete producers have volunteered to submit to inspection and to certify the quality of their product.

In conclusion, Mr. Corbetta threw the challenge at aggregate producers whose product comprises 90 percent of the bulk of concrete. Specifically, he referred to the elimination of flat and elongated pieces.

Noise Control

The problem of noise and practical approaches to methods of its control in crushed stone plants were covered in an excellent presentation by A. B. Hoftiezer, safety supervisor of Laverack & Haines, Inc., Buffalo, N. Y. Emphasis in his talk was on economical means that can be used in reducing the noise level in many operations and he demonstrated his points by actual sound recordings made in crushed stone plants.

Legislative developments in New York and Wisconsin have focused attention on the relationship of noise to loss of hearing and, as a result, Mr. Hoftiezer said that industry must become concerned about it and reducing the problem. He urged that producers study their plants.

The goal sought is reduction of noise levels to 90 decibels or less which he said is a formidable challenge when it is realized that an automobile produces 80-85 decibles when driven at 55 m.p.h. Whether the goal is achievable or not, he emphasized that any reduction in the noise level is important. He recommended that action be taken by producers themselves rather than call in outside "experts" who have no knowledge of the industry. It was suggested that all new employes be given ear examinations.

One of the approaches suggested was to get equipment manufacturers to contribute their part to reducing the noise level. Use of rubber belting material on steel plates in some locations will help the problem. Rubber mountings on vibrating screens will reduce the decibel readings. Vibrators on bins are one of the worst offenders since high frequency noise is most damaging. Enclosing them in wooden boxes is recommended.

Wagon drills have decibel readings of 110 or more and, he suggested, should be equipped with hose exhausts. Trucks operated in mines have 105 to 110 decibel readings which may be reduced by close attention to their exhaust mufflers. Vibrating screen enclosures will reduce decibel readings by 5 or 6.

Rotary drills have decibel readings of the order of 112 in the high frequency range. Use of ear plugs is suggested. Firing of guns for kiln ring removal exceeds 140 decibels and would likely require the use of ear muffs. Older plants were less noisy in some respects, according to the speaker, because they were largely of wood rather than steel.

Fire Insurance

Two talks on the subject of fire insurance were presented before one of

(Continued on page 122)

How Long Will a PAYLOADER Last?

Model HM clocks over 18,000 hours

WALT KEELER, *Pres.*
Walt Keeler Company, Inc.

He says," . . . these machines have given us a more economical performance than the track-laying tractors, due to the abrasiveness of the sand and gravel they are subjected to. Furthermore, rubber-tired tractors are faster, which is also an asset to our operation."

WALT KEELER has used a fleet of tractor shovels for many years on his sand, gravel and ready-mix operations at Wichita, Kansas.

He bought his first "PAYLOADER" tractor shovel, a four-wheel-drive model, in 1949 and added two more later. Last December he traded in the oldest on a new one. This old 1949 unit had clocked over 18,000 hours of use — nearly twice what is considered normal for construction equipment — and was still in fair condition. Needless to say, Mr. Keeler is sold on "PAYLOADER" tractor shovels.

This factual report is not intended to create the impression that every "PAYLOADER" will give every owner 18,000 hours of satisfactory service. But it is an example of what proven "PAYLOADER" design, plus "PAYLOADER" Distributor service and intelligent preventive maintenance by the owner can accomplish.

THE FRANK G. HOUGH CO.
700 Sunnyside Ave., Libertyville, Ill.

Send catalog covering all seven "PAYLOADER" MODELS AND the many useful attachments for them.

Name .....

Title .....

Company .....

Street or Box No. .....

City ..... State .....

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Agronomist Views

(Continued from page 86)

customers of the lime industry in the future. In Minnesota we have fields where we have a pH of 7.8 in one place and not over 10 or 15 rods away we will have a pH of 5.4. You cannot spread lime consistently on land like this and expect to have a repeat customer who obtained satisfactory results without sorting out this area by soil testing. I can recall 20 years ago when the soil test, as poor as it was at the time, was absolutely essential and acceptable by farmers to determine their liming needs. I am not a bit alarmed about the mandatory test because with the A.C.P. Committee here in Minnesota, we have not made it mandatory with the hope that we can bring a gradual change in the use of the test and the use of limestone if we approach this current problem realistically." — P. M. Burson, Professor of Soils, University of Minnesota, St. Paul, Minn.

Capital No Substitute for Soil Fertility

By WM. A. ALBRECHT*

RECENT DECLINES IN TONNAGE OF LIMESTONE used on the farms in the United States from the peak amount in 1947 (under government subsidy) may seem to be due to the dictates of human nature. But in looking at that situation we dare not overlook the possible dictates also by Mother Nature as responsible. That capital will not substitute for soil fertility and move limestone as a form of that on to the soil is a disturbing behavior in economic thinking.

Those human dictates include soil testing, considered mandatory for government payments. We need to remind ourselves that the decline in limestone, even under payments, began as far back as 1947 when no soil tests were required. Soil tests, recently made mandatory, may be decidedly disturbing in many instances, since very often they are dictates about using limestone to get rid of soil acidity, or to reduce the degree of acidity to a certain figure as measured by pH. If we are to follow Mother Nature's dictates in that regard we would forget about using limestone to "fight soil acidity," or to change the pH of the soil. Instead, we would start using it to feed the plants some calcium and some magnesium in the humid soil areas. Instead of making it mandatory to use enough lime to change the pH of the soil to certain values, we might well use soil tests to diagnose the deficiencies in the soil as regards amounts of exchangeable calcium and magnesium, the two reasons why limestone is applied to the soil.

Must Consider Food Value

Of these two nutrients, namely calcium and magnesium, the soil must contain more in exchangeable supply than of any other nutrient element, or even of all the others combined, similarly held there. These again are Nature's dictates if we are going to grow crops that mobilize other fertility elements along with the calcium into themselves. It is Mother Nature's dictate if crops are to get enough fertility from the soil to be creating significant amounts of proteins in plants like the legumes, which are the more nutritious forages rather than just fillers and foolers for our animals. This *is also* the case for the non-legumes given extra fertilizer nitrogen, now plentiful, and making them richer in protein. They may be richer in "crude" protein, that is, they are richer in nitrogen that might be measured as such and considered a protein. But without other fertility beside nitrogen, they will not necessarily be a "complete" protein in all that a protein must be if it is to (a) grow animals, (b) protect them from disease, and (c) make them fecund in reproduction.

Mandatory pH changes in the soil should disturb limestone applications when these soil treatments are guided by laboratory concepts of degree of acidity rather than by the degree of soil saturation with calcium and magnesium to fit the soil into the plant's nutrition according to natural laws and plant behaviors, of which the farmer is still the closest observer.

Another mandatory aspect in bringing on reduction in limestone use is very probably the insistence on applying, at once, all the limestone that one might believe the soil test suggests. Not all the limestone need be applied at once. Even a start, or a partial application, should be encouraged. This partial dosage of the soil's need would be more effective if the agricultural limestone were drilled into the soil. Results of tests of this practice at the Missouri Agricultural Experiment Station have demonstrated the better use by plants of limestone from limited and scattered points of it as concentrated reserves in the soil for root feeding, than from very fine stone intimately mixed throughout the soil body to offset its acidity. To insist that the total amount of limestone, suggested by the soil test, must be applied at once before allotments of pay are made, allows no one to start on his liming program by partial applications in case his financial reserves prohibit doing more. Being mandative to that degree defeats itself. It disregards the facts of Nature long established; namely, that a slight help or just a start at better nutrition for the plant will get some plant response.

Surely no one will deny the wisdom of using soil tests, plant tissue tests, tests by the animals of differences in the nutritional quality of crops grown by liming over no-liming, or any other test to let us learn more about what services the liming of the soil is giving us. Soil tests have helped us to make the very progress that the whole liming program has brought about to date. The dictates by Mother Nature can be more clearly read by way of soil tests than without them. Unfortunately, the distorted interpretation of soil tests by human nature; the mandatory amounts of applications according to pH; and these in the total applications which the farmer's judgment says he can make as a beginning, have been the problem, and the disturbance. It has not been the basic facts given us by the soil tests.

When the peak of limestone use occurred as far back as 1947, and when there has been a decline in the national tonnage since that date, shall we view that curve as a report of no other factors than failing sales propaganda, poor appreciation by farmers of gift funds to conserve soil, inefficient teaching by county agents, and similar other human matters? Isn't it possible that inflations eventually must expend themselves? Isn't it possible, too, that the soil's response to more limestone is no longer registering so strongly by way of crop responses because other soil factors beside calcium and magnesium are coming in as limiting ones and as required soil treatments if better yields are to register the effects from liming? Isn't it possible, too, that with less emphasis on legumes, and more of it on non-legumes fed heavily with commercial nitrogen, that we are losing sight of those crops which formerly indicated

*Chairman, Department of Soils, University of Missouri.

Plant	Average service Permanente Brick	Average service 70% alumina brick	EXTRA SERVICE with Permanente Brick
1	14 months	1 month	13 months
2	24 months	12 months	12 months
3	15 months	3 months	12 months
4	15 months	4 months	11 months
5	14 months	3 months	11 months
6	14 months	3 months	11 months
7	12 months	4 months	8 months
8	15 months	7 months	8 months
9	7 months	1 month	6 months
10	12 months	6 months	6 months
			Average: 9.9 months

Average 9.9 months extra hot zone life!

with Permanente Periclase-Chrome brick

THE FIGURES above were furnished by cement producers during a field check of rotary cement kilns now using Permanente Periclase-Chrome A burned brick. Plants checked have a total capacity of nearly 27 million barrels.

This dramatically improved service is possible because Permanente Brick is *especially designed* for hot zone linings to provide great volume stability under loading, high resistance to spalling and to chemical attack by cement clinker at high temperature. Think what this means in shutdowns eliminated!

In addition, Permanente Periclase-Chrome A Brick takes a good coating in the kiln, usually without inducement.

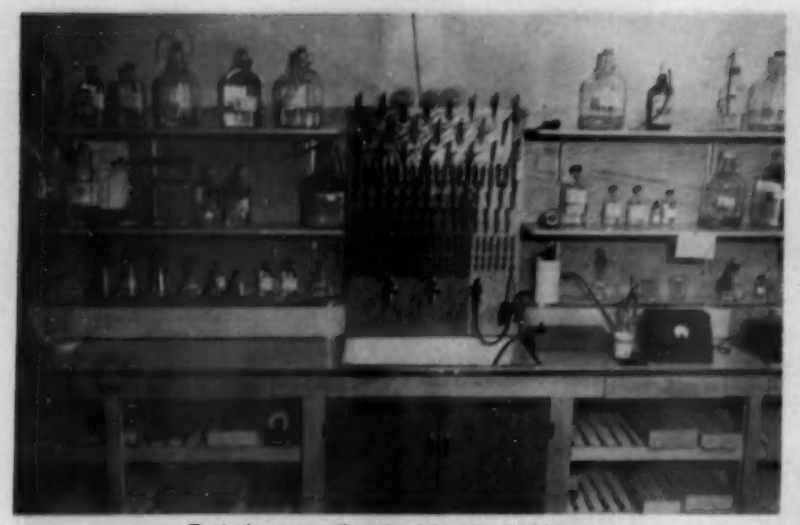
If you are not yet using Permanente brick, let us show you *now* how its superior performance can give you increased clinker production at lower cost!

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite Magnesia • Magnesite • Alumina • Periclase



Typical county soil testing laboratory in Missouri

the effects by limestone as it made up for them the shortages of calcium and magnesium in the soil from which they have been suffering most? Are we not growing more crops as bulk yields of less protein requiring less calcium from the soil as help for that?

Limestone for "Sustaining" Fertility

The fertility aspects, other than limestone, are emphasizing themselves enough to demand more of the farmer's fertility-purchasing power. He is now making investments in "starter" fertilizer almost to the exclusion of having any purchase power left for "sustaining" fertility in the form of limestone. When the high cost of production demands higher acre yields, which are not to be had without heavier applications of starter fertilizers, there is little chance that soils will be built up in the mineral reserves or in the sustaining fertility of which limestone is the major one. Annual applications of complete fertilizer at smaller outlay per acre will hold on while periodic applications, every eight to ten years, of large outlays in limestone and phosphatic rock will be less common. A study of the sales of these fertilizers in their decline may be consoling even if they are not desirably prophetic.

This is the normal and expectable rural economics of buying only what one can afford in relation to one's earnings, regardless of government subsidies, sales promotions, soil tests, or what have you. Mother Nature determines the earnings according as we know what the soils require as plant nutrition on most soils that now includes much more than an occasional heavy dosage of agricultural limestone.

As for the aspects of economics still further considered, it is a prevalent but erroneous belief that "we can now substitute capital for soil fertility" with our greater knowledge of fertilizers and their recent availability in abundance, especially nitrogen "the real booster of crop yields." There may be the belief that government subsidies will increase yields too, when it has been the belief that "the yields of soybean seed per acre in Missouri were pushed up from 11 to 30 bushels by the price of the beans going up." Nature's contribution in the form of well distributed rainfall isn't guided by the price curves. Nor do such economic behaviors of crop values to humans determine the soil fertility values to crop physiology. Unfortunately, funds in our banks don't have creative capacities that can be so directly demonstrated. We can't imagine funds in the vaults creating a crop of corn, or having a litter of pigs there. Some natural factors and forces come into play and our interpretation of agriculture as if it were wholly economics has been one of the reasons why we have not seen some of the subtle forces of Nature under the declining curves. Among those are many others beside that of tonnages of limestone used on the farm under government subsidy. The curve without subsidy has been on a continued but steady rise, inflation or no inflation, to suggest the significance of biological necessity rather than of economics.

Soil Depletion A Vital Factor

According to our economics of agriculture we make no allowance for the fertility of the soil thrown into the bargain when, for example, a sale of a bushel of corn is made. The fertility costs add up to at least 30 cents. With the price of corn at $1.50 per bushel, that amounts to 20 percent of the sale value of the grain or of the products marketed. That represents the rate at which the farmer is liquidating his fertility capital, or is liquidating what he really bought when he purchased the farm. But yet, our economics for agriculture classifies that transaction of selling corn as taking a profit of $1.50, in the case of the landlord.

Should you buy a limestone quarry and start marketing the minerals out of it for agricultural production, you would be allowed 15 percent depletion. Economics of industry allows for mineral depletion in its business of mining, but allowance for mineral depletion of the soil has not yet had consideration as a fair help to the farmer for maintaining his capital and maintaining his business.

When the curve of agricultural limestone tonnage used started declining in 1947 does not that have a portent much more significant than merely one of poor sales propaganda and the neglect of the farmer to grab at federal gift money? Isn't it telling us that the time has come when mining the soil more by means of most any single fertility element applied isn't holding up crop production for profit to buy more fertility? Isn't it also telling us that if the fertility of the soil is to be conserved that conservation must be practiced by the farmer given the economic advantages by which he can do it himself as a business operator perpetuating his business? If he is to maintain the fertility capital in the soil at the high level required to feed all of us, then all of us must help in giving him depletion allowances to stay in the business just as we give non-agricultural businesses and industries the economic advantages by which their invested capital is protected.

Decrease in liming the soil even under federal stimulation by subsidy to the point where federal money is begging to be used has a real significance in connection with agriculture. That decline deserves careful consideration. It tells us that capital in ever larger sums will not substitute for the creative power of fertility in our soils now declining at rates quite significant but still not generally recognized. How long we can remain oblivious to that fact may be much shorter than appreciated when we keep emphasizing the surpluses and our peak productions. We always come to the soil as the last thing in our thinking, and are reminded that capital cannot substitute for the stuff that really creates.

(Continue Agronomist articles, page 120)

*an impressive record * since 1891*

BRADLEY MILLS GRIND MORE FINELY GROUND AGRICULTURAL LIMESTONE THAN ALL OTHER GRINDING MILLS COMBINED

* For sixty-four years, whenever a SUPERIOR agricultural lime-stone product has been desired . . . the standard . . . the indispensable . . . has been Bradley Hercules Mills. Constant progress in design and manufacture has resulted in one efficient, low-cost operation. Automatic electrical feed control eliminates manual operation. Rugged, dustless construction, modern alloys, maximum accessibility keep maintenance costs at an absolute minimum.

The Bradley Jr. Hercules, at top, is ideal for the average producer, and the Bradley Hercules Mill, left, is perfect for the large producer of agricultural limestone. Capacities 5 to 40 tons per hour, depending on the grindability of the rock and fineness required.

Bradley Mills produce more finely ground agricultural limestone than all other grinding mills combined.

Write for catalog—our engineers will help solve your problems.

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

Liming for More Efficient Crop Production

By F. G. MERKLE*

THE IMPORTANCE OF ADEQUATE LIMING in soil building is well established. It is recognized as fundamental by research and extension workers and by practical users of the soil. And yet surveys repeatedly show that a large percentage of our farmers, orchardists and market gardeners are not using sufficient lime to obtain the maximum benefits which should be gotten. Why should this situation exist in this enlightened age? Aside from the unfortunate fact that agriculture permits an existence of the fit and the unfit there are a few obvious reasons why adequate liming of soils is not universal. Some of these reasons will be discussed.

Not Using Enough For Full Benefit

There are many instances wherein the grower has been using lime but has never obtained the real benefits because he has not used enough. Liming compounds do not dissolve quickly nor diffuse throughout the soil readily. Hence, in lumpy soil, liming materials may collect on the exterior of lumps and have little effect on the soil as a whole for several years. Since one function, which may be the most important function of lime, is to inactivate soluble aluminum and manganese, it is highly important that the material be very completely incorporated or mixed so that nearly every soil particle is reached. Experiments in which certain zones were limed and others not limed show that the development of fibrous roots is confined largely to the limed zone.

When a lime requirement test is run the amount required to neutralize the top six inches of soil is determined. If this amount is applied and harrowed into the soil it is probably mixed into no more than the upper three inches. After a few months it will be found that the upper 3-in. layer is nearly satisfied and the lower 3-in. layer is about as acid as it was originally. Visible benefits are obtained by partial neutralization of a soil, but these are not the maximum benefits. Several experiments have shown that top dressing of grass sods with lime compounds requires several years to produce detectable influences only a few inches below the surface. This shows the slow diffusibility of neutralizing calcium in soils at normal moisture conditions.

Because of this slow diffusibility of neutralizing calcium it is often wise to use about twice as much as the theoretical lime requirement calls for and to plow down one-half of the application and harrow in the other half. Having the well-limed, inverted top soil placed in contact with the plow sole causes the plow sole itself to become a better root medium and to encourage worm action in the plow sole.

Should Soil Tests be Used?

There are several reasonably reliable lime requirement tests now available. In fact, chemists can determine the need of lime more accurately than they can the need of any other constituent. In any new liming program, soil tests should be made, not once, but several times after liming material has been applied to determine how well the objective is being realized. One function of a lime requirement test is to locate those rare cases in which no lime is needed. Certainly there is no advantage in liming soil which is already neutral. But a much more valuable use of the soil test is to determine how deeply the neutralization is taking place and how thoroughly. Soil acidity often varies considerably from spot to spot on a given field. Hence, mixing sub-samples may hide the true situation. It is better to take a few well-chosen samples and determine their lime needs individually, and correlate the differences with crop performance.

Fig. 2: Lime and fertilizer make a sterile soil produce; No. 1 fertilized throughout but not limed, No. 21 limed throughout but not fertilized, and No. 3 limed and fertilized throughout

Fig. 1: Showing importance of liming the whole soil. (Pennsylvania experiment) No. 1 is a complete fertilizer, mixed throughout. No. 3 shows pot of clover which has had complete fertilizer and lime mixed throughout. No. 10 shows less active growth of clover with complete fertilizer mixed throughout, but with lime placed near seed only

One very important factor in determining how well roots invade the subsoil is the presence of toxic conditions in this layer. The wisdom of using our subsoils is becoming realized. The practice helps plants to withstand drought. Hence it is important to test the subsoil as well as the top soil and to try to correct the acidity of at least the upper part of the subsoil. This may be accomplished by plowing down a part of the total application.

In certain greenhouse experiments conducted by the writer and his associates, in which certain bands or locations were limed to the neutralization point and other zones or areas remained acid, it was clear that the development of fibrous roots was confined to the limed areas or zones. Very few fibrous roots invaded the acid zones.

Furthermore, the areas filled with fibrous roots possessed a good friable soil structure and in the other areas the soil was lumpy. The experiments justified the conclusion that neutralizing agricultural limestone does not move freely through the soil at normal moisture content and that for rapid

(Continued on page 122)

*Professor of Soil Technology, Pennsylvania State University.

Why Bucyrus-Erie
INDIVIDUAL DESIGN

Means LONGER Excavator Life

Look around you — you'll see Bucyrus-Erie excavators in all kinds of digging that have outperformed and outlived their contemporaries. This is no accident! Bucyrus-Erie's unique Individual Design helps put long life into each model.

Careful attention is paid to each engineering detail to make certain that no part will be called upon to do more than it should — that each part is designed to handle peak loads safely. With main machinery, power unit, and mounting all perfectly matched to front-end capacity, the danger of over-stressing gears, shafts, drums, clutches, cables, etc., is reduced to a minimum. In addition, Bucyrus-Erie manufactures its own castings . . . maintains a continuous metallurgical and design research program to help give every Bucyrus-Erie machine a head start to a long and productive life.

See your nearby Bucyrus-Erie distributor for complete information on the size machine you need — 3/8- to 4-cu. yd. capacity.

89E54C

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

Liming Efficiently

(Continued from page 120)

results we must place the material mechanically where we want it.

Hence, plowing down half the application and harrowing in the other half on the plowed surface is logical. This is illustrated in Fig. 1, which shows how the fertilizers have been curtailed in pot 1 by acid conditions. It shows that liming close to the seed in pot 10 gave some growth, but a very small root system, and how much better growth of both top and root was obtained where adequate lime was mixed throughout the entire pot.

In Fig. 2 the comparative effects of fertilizers and of lime are shown in the growth of crimson clover on an acid soil. On this soil lime alone was more effective than fertilizer alone in top and root growth. But the combination of lime and fertilizer in pot 3 gave the best growth. It is wasteful to apply expensive fertilizers on a soil whose lime requirement has not been fully satisfied in advance.

Limestone Salesmanship Where to Direct It

By EARL E. BARNES*

IF ALL THE LAND WERE LIMED TO NEUTRALITY, the job would not be done, for each drop of water which percolates through the soil removes a minute portion of lime and in the course of 4 or 5 years, in the humid regions this adds up to a ton of calcium carbonate. To replace this continual loss would require more limestone than was used in 1947 or any other year.

The cause of lower sales of lime is not that all the land has yet been limed to neutrality. To accomplish this requires sales effort directed toward those who in the past have never used lime and also toward those who have the initial job done but must be sold on the necessity of the follow-up job of replacing the lime which has leached away, never allowing it to become more acid than about 6.5 pH.

It would seem that to do this follow-up job will require the application of one ton of limestone every 4 to 6 years. Each rotation, before a sod is plowed up the soil should be tested and if the reaction has fallen to 6.5 pH another ton should be applied. If this is applied to sod which will be plowed afterwards, it allows a long period during which the job may be done. Any time after making the last cutting of hay in the late summer and until the land is to be plowed is a good time to make the applications. There is another reason for choosing this point in the rotation to make the application. Hauling agricultural limestone on to field in large trucks will compact the soil less if there is a sod on the field than it will at some time in the rotation when the field is not covered with a heavy sod. Compaction is now realized to be detrimental to most soils and is to be avoided.

Some have blamed the APC rule regarding testing soil before liming for the falling off in tonnage sold. True, many such tests will show that the soil needs only one ton, while the dealer would like to spread two tons, because it takes only half as much driving to unload the truck. However, from the farmer's standpoint it would be better to spread the two tons on two acres rather than on one, if one ton is all that is required to bring the soil to the optimum reaction. On the other hand, on fields which have never been limed the test may show the need of 4 or 5 tons. Here again it is to the farmer's advantage to apply at the needed rate. In these cases testing will increase the demand for limestone. The trouble seems to be that the salesman is passing up these potential users, because they have never been shown the benefits from lime and they are harder to sell. This it would seem is the place to exercise salesmanship, not neglecting the man who has used lime and may need only a ton per acre.

Some distributors object to spreading lime at one ton per acre at the same rate per ton as charged when it is applied at a heavier rate. This makes sense. I do not believe that many farmers would object to paying a small premium when the limestone is spread at lower rates than 2 or 3 tons per acre. Certainly it is worth more to him to have the lime applied where it is needed rather than to apply it too heavily on part of his farm only to have the rest of the farm get none. Perhaps the best way would be to price the lime on the basis of lime delivered to the farm, and then charge in addition on the basis of the number of acres covered. On such a basis, let us assume that the dealer would price the lime at $5.00 per ton delivered at

(Continued on page 134)

*Dept. of Agronomy, Ohio Experimental Station.

Crushed Stone Convention

(Continued from page 114)

the operating sessions. W. E. Schmidt, Columbia Quarry Co., St. Louis, Mo., stressed the need for full coverage.

In taking out insurance he reminded that changing values in a rising market must be taken into account so that insurance will be sufficient to replace the property. He recommended that airplane, bombing, etc., coverage be taken and that a complete survey be made by the insurance carrier, incorporating complete facts from the producer on values.

Another suggestion was that the Fire Rating Bureau be requested to inspect the property and make suggestions for changes to reduce the rates. Approval of new plans for plant building should also be sought of the Fire Rating Bureau of the State and statements of value should be filed with the Bureau, which values would consider the increased costs of building.

Mr Schmidt advocates building of as complete fireproof construction as possible because lower rates then apply, but he warned that so-called fireproof buildings will burn. He told of a completely fireproof plant of steel and concrete built by his company to replace one destroyed by fire, that later had a fire and 50 percent damage.

He suggested that good housekeeping practices be followed and that adequate fire extinguishers be provided and re-charged annually. Also, he advocates that business interruption insurance be taken.

Practical ideas on how to reduce insurance premiums were presented by Richard L. Campbell, Harry T. Campbell Sons' Corp., Towson, Md. Mr. Campbell confined his remarks to his own company's experiences, which would apply in most cases to any producer. Several fires had been experienced at one of the company's plants, which prompted that action be taken.

He reminded that the insurance carriers' risks are the producers' risks and that producers seek low rates because a low level of rates means there will be little chance of fire. Loss of business because of fires is an important item that must be considered.

The company has changed its ways and has become fire conscious. Efforts are concentrated on ways to make both old and new structures more fire resistant. Cooperation of the insurance companies is sought in disclosing vulnerable spots and many practices have been corrected as a result.

This company has had rapid growth the last 15 years and much of the building has been done in a rush, with the bulk of the design and construc-

(Continued on page 124)

The Price Alone of CRD one-use bits can lower your drilling costs

. . . and they are made and backed by CLEVELAND Rock Drill

How do Cleveland CRD one-use bits save you money? It's just plain economics. You see, the price of CRD bits on an average, is less than one-half that of a multi-use bit. In fact, the price of a CRD bit comes close to matching the cost of reconditioning a multi-use bit.

So the price alone of CRD one-use bits can help you cut your drilling costs. But there are other reasons to use CRD bits, too.

Faster Drilling Speed — Special offset gauge feature, which permits the use of thinner wings and a steeper reaming angle, greatly reduces binding and provides ample clearance for cuttings. Result is a free, fast-cutting, chiseling action that gives you greater drilling speed.

Less Drill-Steel Breakage — The method of attachment used with the CRD bit eliminates threads on the drill rod. Since a drill rod is only as strong as the root diameters of its threads, the tapered threadless CRD design provides longer drill-steel life — reduces drill-steel handling and reconditioning costs.

Lower Rock Drill Repair Costs — Because the CRD bit design reduces binding in the hole, there is less strain on the rotation parts of your rock drills. Rifle bars, rifle nuts, and chucks last longer. You get more drilling done at lower cost.

Since no special equipment is needed for reconditioning bits or threading rods, you owe it to yourself to try a can of CRD bits. They're ideal around the quarry for wagon drills, drill rigs, or secondary drilling. A short trial will give you first-hand information on the ability of these bits to cut drilling costs in your property, as they have in so many others.

Bulletin RD-29 gives detailed information. A copy is yours for the asking — just write for it.

Pneumatic knock-off machine makes it still easier and quicker to use CRD bits. Hand knock-off tools also available.

SPECIFICATIONS

Quarries everywhere cut drilling costs with CRD DETACHABLE DRILL BITS
4-Wing Type — Center Hole — Side Hole

Series "A" Bits For series "A" drill steel connection on any steel. Best suited to ⅞" steel.	1¼	Aluminum	Series "B" Bits For series "B" drill steel connection on any steel. Best suited to 1", 1⅛", and 1¼" steel.	1¾	Orange
	1⅜	Pink		1½	Green
	1⅜	Deep Green		1⅝	Yellow
	1¾	Brown		1⅝	White
	1½	Grey		1¹¹⁄₁₆	Black
	1⅝	Maroon		1¾	Red
	1⅝	Deep Blue		1¹³⁄₁₆	Blue
				1⅞	Tan
				1¹⁵⁄₁₆	Plain
				2	Pink
				2⅛	Maroon
				2¼	Aluminum

Cans are labeled showing size of steel socket, gauge of bit, and color.

CLEVELAND ROCK DRILL DIVISION
Westinghouse Air Brake Co.

12500 BEREA ROAD
CLEVELAND 11, OHIO

RD-03

Are your bags salesmen ?

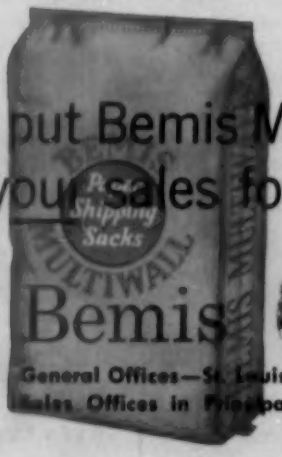
A prominent Mid-western company in the rock products field recently instructed its salesmen:

"Exploit the fact that we use Bemis Multiwall Bags 100% and capitalize on the established excellent reputation of the Bemis Bro. Bag Company for quality workmanship and materials."

We are naturally pleased by this testimonial to the quality which we constantly work to put into your bags.

Even more, we are glad to have such confirmation of a point we have often stressed:

Good, well printed bags are a real sales help!



Why not put Bemis Multiwalls on your sales force?

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

tion done by company personnel without checking with the insurance carriers. A great deal of the work was built of wood, but that practice has been discontinued in favor of steel and concrete with reinforced concrete roofs where practicable. Elimination of wood has reduced basic rates very materially. Steel and concrete construction has also proved as cheap as wood.

Unprotected stair wells in 2-story structures have been equipped with fire doors, and fire extinguishers and hydrants provided according to accepted standards. The use of no smoking signs, proper location of watchmen's clocks and the use of containers for oil rags have all reflected in lower rates. The goal is to cut the rates in half.

Housekeeping is very important in holding down rates since the insurance inspector considers a poorly kept plant an indicator of safety hazards and indifferent personnel.

Accident Prevention Report

C. A. Gustafson, chairman of N.C.S.A.'s accident prevention committee, presented a report that showed good progress in reducing accidents. Not a single fatality was reported in 1954, which compares with 10 in 1951 and 1952 and four in 1953.

Reports were received from 102 plants in 1954 which was an increase of 10 over 1953, and covered 9,254,844 man-hours. Thirty-three percent of reporting members had no lost-time accidents as compared to 30 percent in 1953. There were 11 permanent

(Continued on page 126)

Chart at convention showing lineup of quarries with no-accident records in 1953

what does

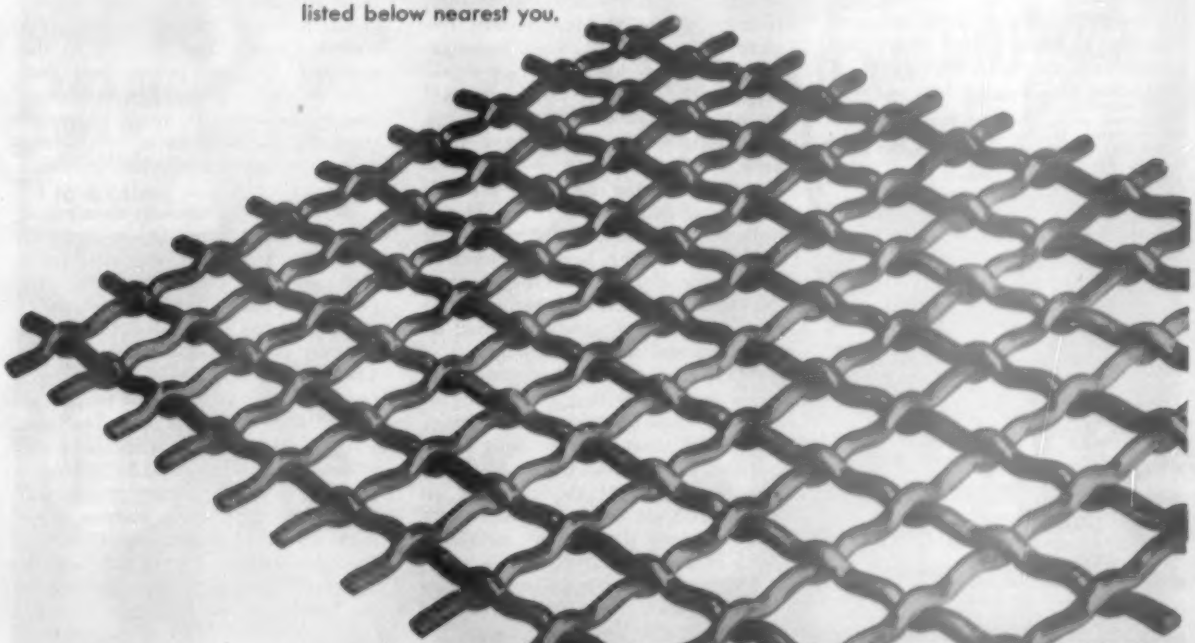
PRECISION

mean to you?

To us it means space screens that are built as tools of production.

- **Made from wire that is crimped to precision standards.**
- **Then woven extra tightly to maintain accurate, uniform spacing under the severest conditions.**
- **Results in *precision* openings that will maintain their accuracy under the severest vibration.**

Let us show you how Super-Tempered Precision Space Screens mean greater tonnage output per screen dollar. For additional information write to 56 Sterling Street, Clinton, Mass. or contact the sales office listed below nearest you.



SUPER-TEMPERED
PRECISION SPACE SCREENS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo
Chicago • Detroit • New Orleans • New York • Philadelphia

2468

partials in 1954 compared to 9 in 1953, and the number of temporary injuries improved from 222 in 1953 to 169 in 1954.

In 1953, 17 railroad accidents were reported and there were none in 1954. Using tools accounted for the most accidents in 1954. There was a decrease in dust cases which is attributable to more effective use of goggles. Truck driving accidents dropped from 14 in 1953 to only 2 in 1954.

Back injuries, while highest, took a notable drop in 1954, toe injuries were cut in half, and head injuries were reduced but not to a satisfactory level and may be improved by greater use of safety hats. A complete breakdown of injuries by plants was presented.

Safety Awards

Presentation of N. C. S. A. safety awards for 1953 in the contest conducted each year by the U. S. Bureau of Mines was made by J. J. Forbes, Director, U. S. Bureau of Mines, at the general luncheon. The awards are provided by *Explosives Engineer* magazine.

Winner of the trophy was the Greystone Quarry of Greystone Granite Quarries, Inc., Henderson, N. C., which operated 190,859 man-hours without a lost-time accident. The trophy was received by superintendent C. H. Wolfe.

Honorable mention certificates were awarded to other plants which had no lost-time accidents, as follows:

Kimballton mine, Standard Lime and Stone Co., Kimballton, Va.
Bakerton mine, Standard Lime and Stone Co., Bakerton, W. Va.
Red Hill quarry, Superior Stone Co., North Garden, Va.
White Haven quarry, General Crushed Stone Co., White Haven, Penn.
North Branford No. 7 quarry, New Haven Trap Rock Co., North Branford, Conn.
Bakers quarry, Superior Stone Co., Monroe, N. C.
Bedford quarry, Blue Ridge Stone Corp., Bedford, Va.
Auburn quarry, General Crushed Stone Co., Auburn, N. Y.
Rock Hill quarry, General Crushed Stone Co., Quakertown, Penn.
Watertown quarry, General Crushed Stone Co., Watertown, N. Y.
Cedar Hollow quarry, Warner Co., Devault, Penn.
Jordanville quarry, General Crushed Stone Co., Jordanville, N. Y.
Holston quarry, American Limestone Co., Mascot, Tenn.
Joliet quarry, Lincoln Crushed Stone Co., Joliet, Ill.
Plainville No. 4 quarry, New Haven Trap Rock Co., Plainville, Conn.
Wallingford No. 1 quarry, New Haven Trap Rock Co., Middlefield, Conn.
Stoughton quarry, Stoughton Crushed Stone Co., Stoughton, Mass.
Prospect Stone Plant No. 6 quarry, Eastern Rock Products, Inc., Prospect, N. Y.
Waukesha quarry, Waukesha Lime and Stone Co., Inc., Waukesha, Wis.
Randville quarry, Superior Rock Products Co., Iron Mountain, Mich.

Asphalt Institute

In a talk entitled "The Role of the Asphalt Institute in the Asphalt Paving Industry," president J. E. Buchanan of the Asphalt Institute discussed the mutual interests and responsibilities between his organization and the crushed stone industry in improving the performance of asphalt paving surfaces. He also described the aims and objective of the Asphalt Institute.

About 11 million tons of the total of 15 million tons of asphalt produced annually from the refining of crude oil is used for paving purposes. The Institute is an organization largely of engineers experienced in the engineering use of asphalt. A principal effort is in assisting highway engineers in the proper design and specifying of asphalt structures, and in assisting constructors to achieve good workmanship and quality. The Institute's publications program is set up to produce a reliable set of engineering references.

Future prospect for the asphalt mixture business is tremendous in the suburban areas alone said Mr. Buchanan. He said that there is too much evidence of asphalt mixtures being placed on inadequately prepared or designed bases which, in the long run, can only result in harm to the reputations of the products used and the industries producing them.

The recent move of the Institute's headquarters and laboratories to the University of Maryland was done to provide needed space for the conduct of more efficient research and development and to improve liaison with organizations and agencies having common interests. There will be more space for research and development and for outside testing.

Project committees are at work on specific research problems aimed at both traditional and newly-developed fields of use. A substantial part of research and engineering effort is in preparation for the anticipated enlarged program of highway construction to meet the demands for our growing population. Other projects in for increased research are (1) water and soil sonservation through low-cost asphalt facing and lining of dams, canals and reservoirs, (2) treating of railroad ballast with asphalt and (3) soil stabilization with asphalt.

Blast Produced Vibrations

THE NEED FOR FUTURE INVESTIGATIONS into the complexities of human reaction to impact was emphasized in a paper, "Human Response to Blast Produced Vibrations" by Jules Jenkins, Vibration Measurement Engineers, Chicago, Ill. Such investigations would develop data which would disprove the claims so often expressed by people relative to the effects of vibrations, which claims have been used so often in setting up regulations detrimental to the industry and in adverse legal decisions.

Persons subjected to the vibrational effects of blasting have developed a formidable array of false beliefs, said Mr. Jenkins, which have become firmly implanted and widely accepted by persistent and repeated selling.

These typical misconceptions include asumptions that the rattling of windows must be followed by damage to a house, that a house must suffer because it is located on a rock vein, that blasting is of the order of an earthquake, etc. Such false ideas continue despite denials by individual users of commercial explosives.

Mr. Jenkins said that a great amount of educational effort will be required on association levels to change the public mind and that it is timely for the crushed stone industry to consider a program of public relations in order to meet a serious problem.

Legislative trends presently sweeping the country are strongly influenced by thinking of laymen, he said, and many proposed regulations are the result of their misconceptions. Once enacted, such regulations become seriously restrictive.

A program of public relations such as he suggested would firmly implant in the minds of the public the great contributions of the industry to the economy and the public, and true facts to clear up misunderstandings. The public would be made to understand that the behavior of commercial explosives can be controlled and with safety.

In the use of seismology to interpret blast produced vibrations in terms of damage to structures, wide discrepancies have been observed between reported vibration tendencies based upon human reactions and the actual intensity as determined by instruments. The fields of physiology and paychology are involved and must be considered if the problem is to be resolved.

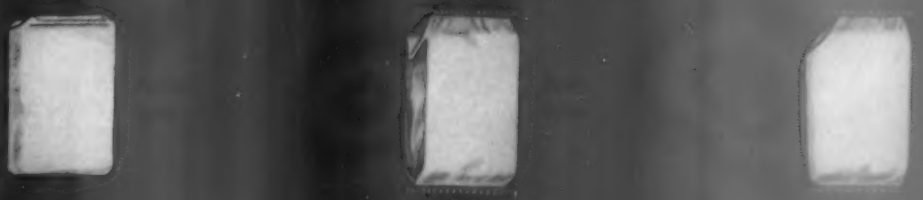
Investigations thus far on human reaction to vibration have been largely confined to steady state motion and not with impact forces such as occur from commercial blasting. However, they do disclose data which will be important in impact investigations of the future.

Mr. Jenkins told of studies in Germany in 1931 and 1935 where persons were subjected to continuous oscillations of a vibrating platform over a range of frequencies and amplitudes that correspond in general to the range from blasts in quarries and mines. The subjects were in standing and reclining

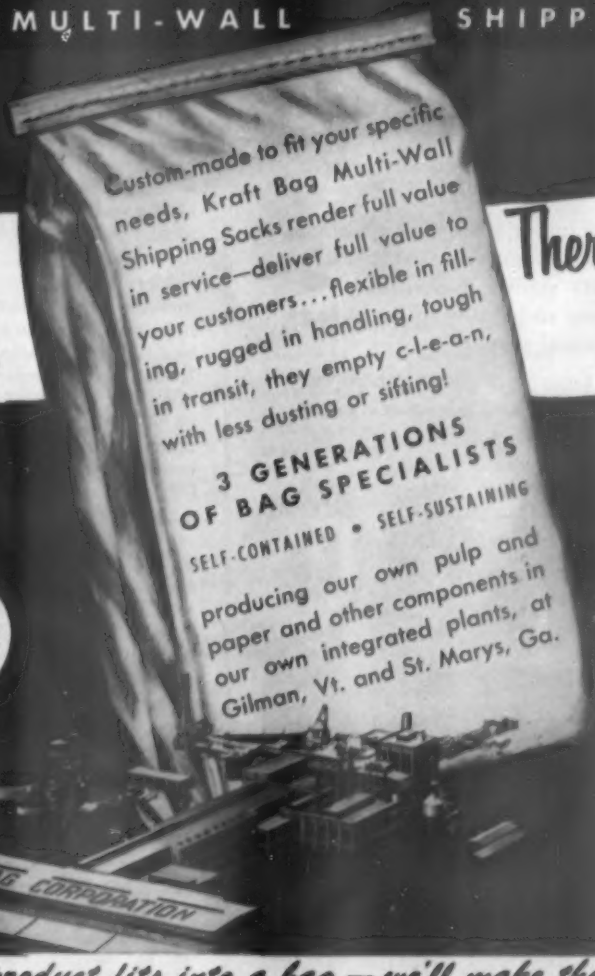
(Continued on page 128)

DEPENDABLE as a source... DEPENDABLE as a service

KRAFT BAG MADE-TO-ORDER HEAVY-DUTY



MULTI-WALL SHIPPING SACKS


Custom-made to fit your specific needs, Kraft Bag Multi-Wall Shipping Sacks render full value in service—deliver full value to your customers... flexible in filling, rugged in handling, tough in transit, they empty c-l-e-a-n, with less dusting or sifting!
3 GENERATIONS OF BAG SPECIALISTS
SELF-CONTAINED • SELF-SUSTAINING
producing our own pulp and paper and other components in our own integrated plants, at Gilman, Vt. and St. Marys, Ga.
KRAFT BAG CORPORATION

2 to 6 ply plain or printed 1 to 4 colors

There is no substitute for kraft!

Gilman PAPER CO.
• St. Marys Kraft Corp.
• Gummed Tape Div.
• The Celluseal Corp.
• Kraft Bag Corp.

KRAFT BAG CORPORATION

GILMAN PAPER COMPANY SUBSIDIARY
630 Fifth Avenue, New York 20, N.Y.
Daily News Bldg., Chicago 6, Ill.

If your product fits into a bag — we'll make the bag to fit your product.

How can Owen Grapples *grasp* odd shaped stones and *hold* them securely under seemingly impossible conditions?

The answer is easy and logical...Owen is the *only grapple in which each tine operates independently.*

When power is applied all tines move toward the center. The one first meeting strong resistance grips and the others continue to move until each meets similar opposition. The result is tremendous gripping power and ability to grasp and hold objects regardless of their unusual shapes.

Send today for the Owen Rock Grapple Bulletin which explains this exclusive patented principle and illustrates many interesting handling operations.

THE OWEN BUCKET CO.
6040 Breakwater Avenue · Cleveland 2, Ohio
Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

positions and vibrations were applied parallel and transverse to the axis of the body.

Sensations experienced were rated as not noticeable, barely noticeable, well noticeable, strongly noticeable, objectionable and uncomfortable. The degree of sensation varied widely between subjects and the same sensation was not always experienced by the same person reacting to identical vibratory motion. A wealth of valuable data was obtained.

It was found, for example, that for 10 cycles the effect of vertical movement applied to a person standing must be increased 9 times over perceptibility before becoming objectionable and 32 times before becoming uncomfortable.

In general, when standing, it takes twice as much horizontal movement than it does vertical movement to invade the objectionable — uncomfortable limits. When movement is confined to the horizontal direction, the reclining body is most sensitive to motion applied transverse to the body axis. The human body under steady state agitation is most sensitive to vertical motion when the subject is standing and least sensitive when reclining.

He touched upon the "startle effect" and its influence in a person's decision that he detests a certain noise. The average person, he said, can feel vibrations that are from one hundredth to one thousandth part of the magnitude necessary to damage structures.

Until this is firmly implanted in the public mind, problems associated with human response to blast produced vibrations will continue to be acute. Evidence on hand indicates that the body can withstand a greater degree of shock under impact than it can under prolonged agitation, and further investigations to substantiate that belief are needed, he said. Blast-produced vibrations might be increased as much as five or ten times that of steady state motion before the objectionable-uncomfortable zone is reached, in his opinion.

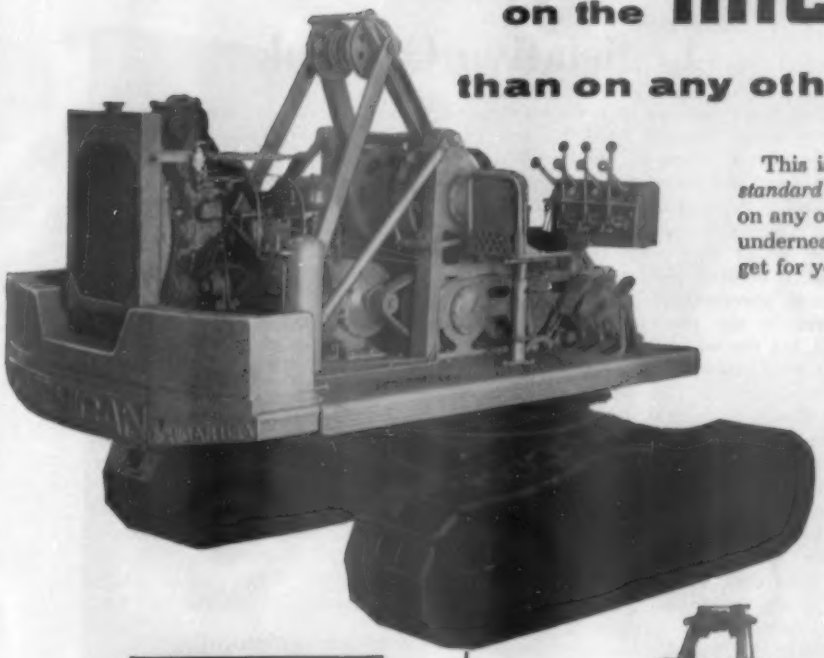
Mr. Jenkins concluded by reviewing how seismographic research has been successful in defending many lawsuits and by again stressing the need for joint effort in developing more technical data and informing the public.

Subrogation

W. C. Rowe, chairman of the subrogation committee, outlined the serious problems encountered by the industry with respect to vibrations from blasting. His committee was formed in 1953 to investigate evils stemming from

(Continued on page 130)

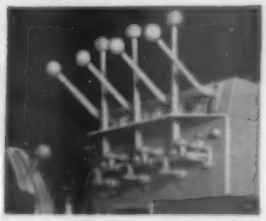
More "Big Machine" Features on the MICHIGAN C-16 than on any other ½-yard crawler!



This is a fact: more "big machine" features are *standard equipment* on the MICHIGAN C-16 than on any other ½-yard crawler. It will pay you to look underneath — look inside to see how much more you get for your money.

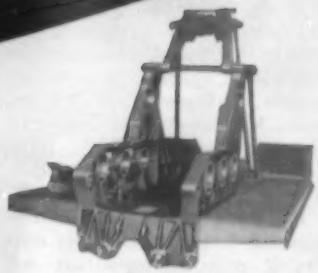
This machine is built for quality-conscious users—for bigger yardage, bigger tonnage, and substantially lower maintenance. The C-16 invites a feature-by-feature comparison with other same-capacity machines.

Write for detailed literature on this ½-yard crawler with big machine features and durability. Or contact your local MICHIGAN distributor. Like all MICHIGAN machines, the C-16 is available on a low-cost Lease Plan—details available.



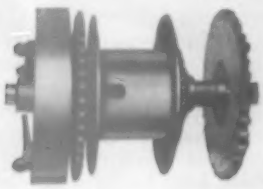
Power Control Independent Travel

Air Controls are standard on all MICHIGANs . . . fast, smooth, precise, with low operator fatigue. Independent Travel is also standard . . . move up while hoisting, swinging, or dumping.



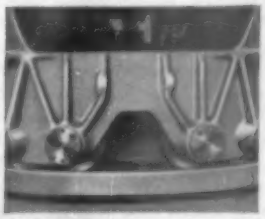
Cast Steel Deck

This feature is usually found only on 1-yd or larger machines. C-16 deck is one-piece, alloy steel casting . . . side frames, boom foot lugs and roller brackets are cast integral. No misalignment!



Power Load-Lowering

Four shafts on the C-16: Swing, Hoist, Travel and Crowd . . . each with its independent clutches. For precision crane work, the hoist line can be reeved on the front drum to provide Power-Up and Power-Down.



Six Hook Rollers

You can swing the boom just by leaning against it. There are 6 ball bearing-mounted adjustable hook rollers on the C-16 . . . grease twice a year. Most other ½-yd machines have only 3 or 4 rollers, bushing-mounted.

Smooth Clutches

There's nothing smoother than MICHIGAN air-operated segmented disc clutches . . . and they are self-compensating for heat, self-ventilating and self-cleaning. All segments are interchangeable.

Cast Steel Car-Body

Circle gear, with hook roller paths, internal gear teeth, center post, and crawler drive gear case is cast integral. Standard alloy steel tracks are 20″ wide, 9′10″ long. Swamp pads are optional: 30″ wide, 11′10″ long.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY, 452 Second Street, Benton Harbor, Michigan. (29A)

Construction Machinery Division
Phone: WA 6-6184

Please send literature:

☐ C-16 Detailed Bulletin

☐ MICHIGAN Lease Plan Bulletin

Name_____

Firm_____

Address_____

City_____ Zone____ State_____

many home owners carrying extended coverage for their homes against damage from explosions, smoke, etc.

Demands for payments under extended coverage clauses are resulting in insurance companies paying claims for alleged damages from blasting without the crushed stone industry's knowledge. Having paid such claims, the legal departments of insurance companies then attempt to recover from producers.

Generally speaking, insurance companies have little knowledge of the industries and developments in use to control blasts, so the problem resolves itself to the need for educating insurance carriers and showing them how they are wasting funds. Details of progress in the use of milli-second delay blasting to meet the problem must be passed on to insurance companies, and state regulatory bodies must also be educated as well as fire underwriters. It's a matter of public relations at the local level.

Selling

A most unique and inspiring presentation, "Selling Against Sales Resistance," was put on by Alvin C. Busse and Richard C. Borden, nationally famous sales analysts. They put themselves in the position of salesman and prospective customer and, in the style of a vaudeville act, illustrated correct and incorrect selling technique. The presentation was a forceful way of driving home the fundamental points of effective selling procedures which have largely gone lost or forgotten during the recent years of a sellers' market.

Five fundamental points were driven home. Under the first, entitled "Touch Each Base," the main points of selling were likened to the three bases and home plate on a baseball diamond. Each was representative of a selling step. It was brought out that if a salesman leaves out essentials to get to the price quickly, he will fail. Also, he must justify the higher price to the customer, should his price exceed that of a competitive product.

"Be Sure Each Base You Touch is a Benefit" was the title for the second point. It was pointed out that customers buy benefits which should be stressed rather than points about the product. The idea is to convert product points into benefits.

Under the third point, "Make Your Selling Spikes Penetrate," strong visual showmanship comes into play in order to drive home the selling points. Whenever possible, such visual demonstration should get the customer actually into the act.

The fourth point, "Ask for the Order," is a matter of asking for the order which the salesman feels he has earned by his presentation. There should be no fumbling on this point, it was stressed, assuming that the total selling effort has been presented.

Point number five, "Make Objections Lose Force Without Making Customers Lose Face" is a matter of downing objections to a product by upping the desire for it.

Legislative Outlook

IN HIS DISCUSSION OF THE WASHINGTON SCENE and the legislative outlook, John F. Lane of the law firm Gall, Lane and Howe, general counsel for N.C.S.A., said that the matter of state's rights is the most important issue of our time. That fundamental conflict between the states and the federal government may not be resolved in the present Congress, he said, but the well being of the nation will be determined on how it is ultimately resolved. He was referring to the threats of socialism and expanding bureaucracy.

Rulings which relate to the issue of states' rights, he said, will have an important bearing on domestic legislation and particularly in the field of labor.

The federal government, he reminded, is one of limited specified powers, and unless power be granted specifically to the federal government in the constitution, the right to jurisdiction in matters of issue is reserved to the states. He spoke of the abuses of recent years in taking power from the states. A commission has been appointed to study the problem.

He spoke of the opposition to be expected from this congress on matters of proposed legislation. An informal poll has indicated almost a stand-off between those in congress who will support or be opposed to administrative proposals. The number who voted as undecided could influence the results and the states rights issue will figure in how the undecided will vote.

The president has asked for standby powers to regulate wages, hours, etc., and likely such powers will be granted. A very detailed program of planning is going on in the Defense Mobilization office covering regulations for control of wages and prices, the rationing of goods, etc. This all would be developed into a package deal of regulations and controls to be adapted at the local level to meet the eventuality of atomic attacks and other emergencies.

The Eisenhower recommendation to increase minimum wages from 75 to 90 cents per hour will have no bearing on the crushed stone industry. However, proposals for extended coverage and decreased exemptions may involve issues of states rights. Whereas 17 states have their own right to work laws, stating that workers need not be members of a union in order to work, the Secretary of Labor has said that such state laws are bad and that it is hoped there will be no more of them.

A National Right To Work Committee has recently been established by business interests which has as its objective promotion of the principle that men have the right but are not to be compelled to join unions. This may prove to be the most important question on labor before this congress.

A "no man's land" exists in the field of labor law crises not covered by federal statute and courts have implied conflict between the states and federal government in certain decisions. In Florida, for example, it was required that unions register. This, the Supreme Court held, was in conflict with guarantees in Taft-Hartley Act.

Philadelphia Meeting of A.S.T.M.

THE PHILADELPHIA DISTRICT COUNCIL OF A.S.T.M. held a meeting April 12, at Franklin Institute, Philadelphia, Penn. The two speakers at the meeting were H. L. Kennedy, manager, Construction Specialties Div., Dewey and Almy Chemical Co. and Stanton Walker, director of engineering, National Ready Mixed Concrete Association. "Concrete Practices in Europe as Compared to the United States" was the subject of Mr. Kennedy's talk, and was based on observations and conferences during his recent trip to eight European countries. He gave a comparison of European practices with American practices and described how progress in concrete technology in those countries seemed to follow the progress along other industrial lines. His talk also included a discussion of 2000-year-old concrete from the Bay of Pozzalui near Naples, Italy, and plastic concrete versus zero slump.

Mr. Walker's talk was on "Evaluation of Acceptance Tests for Concrete," and included a discussion of the causes of variations in the test results for strength, consistency and air content of concrete, as well as means for reducing the variations.

Gravel Plant

HAWARDEN GRAVEL CO. has started operations at its new screening, washing and crushing plant at Hawarden, Iowa.

performance of new SIMPLICITY GRIZZLY-FEEDER draws highest praise from user . . . E. W. Hallett

See us at Booth 2032-2034, Materials Handling Exposition, Chicago, May 16th to 20th

View showing discharge end of the Simplicity 3' x 10' Grizzly-Feeder.

A year ago Mr. E. W. Hallett, President of the Hallett Construction Company of Crosby, Minnesota ordered a Simplicity Oscillating Feeder with a grizzly deck. In a letter we received from him recently, he says: "That feeder works perfectly, and we have never had one pebble hang up on the grizzly part of it. We are very much pleased with it. I believe that it would feed 700 tons an hour if we were to call on it to do it." This is high praise indeed, but it is praise well directed, for the Simplicity Grizzly-Feeder is a new and important contribution to the mining and quarrying industry.

Cuts costs 50%

This unit combines scalping and feeding in one operation, thus completely eliminating the old type apron conveyor and stationary grizzly. The savings are readily apparent . . . you gain additional plant room and save 50% in operation and maintenance costs. The unit is available in sizes from 2' x 8' to 6' x 12', and in capacities up to 1000 tons per hour. A request to us at Durand or to any of our many sales representatives will bring you full information about the Grizzly-Feeder.

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.

FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.

FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

Simplicity

TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 13, MICHIGAN

PACK and SHIP in

QUALITY MULTIWALLS

by CHASE BAG COMPANY

CHASE makes sure you get the right bag for your needs. All types and sizes available.

The CHASE reputation for quality is justly earned—108 years of experience.

You avoid costly delays when you deal with CHASE. Fast service from convenient shipping points assures "on time" delivery.

Place your next order with CHASE!

CHASE BAG COMPANY

General Sales Offices, 309 W. Jackson Blvd., Chicago 6

For EFFICIENT SCREENING of Lime, Ag-Lime and Silica Sand

The Leahy® No-Blind Vibrating Screen equipped with FlexElex heating of the screen jacket is made for the toughest, most stubborn screening jobs you can find. It screens damp or sticky materials at fine mesh with an economy and efficiency you would have declared impossible only a few years ago. Send for performance records and full information.

Ask for Bulletin 15-J

THE DEISTER CONCENTRATOR COMPANY

913 Glasgow Avenue — Fort Wayne 3, Indiana

Fine Sand Recovery

(Continued from page 72)

railroad cars. The finer overflow goes to distributor box with two outlets. One outlet returns a part of the overflow back to settling pond "A," and the other leads to the final waste pond. Before reaching the final waste pond the thin pulp flows down a drainage area where additional fine sand settles out that is recoverable. Thus, with the 72-in. cone as well as with the 34-in. unit, a part of the pulp going to it is in closed circuit with the pump. Means are available to send all material from the pump back to the pond when cars are being re-spotted under the cone. The cone has a 6-in. outlet and uses a 90-deg. steel elbow similar to the other.

In the final waste pond there is an accumulation of fine sand similar to that mentioned above and which also is recoverable. The material is white in color and appears to have a low iron content. Some finely divided clay may be entrained in the matrix.

The cone is a company-made unit fabricated from an older 6-ft. diameter cone. It is 7 ft. overall high with a 24-in. vertical section. The lift from the 8-in. Georgia Iron Works pump is 30 ft., with a total pipeline length from pump to cone of 80 ft. The pressure at the inlet to the cone is 15 p.s.i. and within the cone is 12 p.s.i.

The feed to the cone has the following analysis: 10 percent passing 16 mesh and 20 percent passing 100 mesh. The finished sand analysis is 10 percent passing 100 mesh and 70 percent passing 50 mesh. The cone produces about 225 t.p.h. of sand that is classed as an extra fine masons sand and appears to find a wide acceptance in the marketing areas.

A novel type belt conveyor is used to get sand from the discharge point of the belt conveyor from the Eagle sand screws to the truck loading bins. These bins parallel the railroad track and are opposite the car-loading point. An inclined belt conveyor mounted on a tall steel column is pivoted and can be swung parallel to the railroad track when not in use. When it is desired to fill the truck bin, the swivelled conveyor is swung at right angle to the track, and the toe of the conveyor then comes under the shallow cone that is used to receive the sand from the screw classifier and from the 34-in. liquid cyclone. The high end of the swivelled conveyor is then over one of the bins. A second swivelled conveyor is on top of the bin and can distribute material to any compartment. A new 200-ton capacity, cone-bottomed steel bin was being assembled at the time of inspection, and it will be filled from the second conveyor.

GET TRUCK PAYLOADS!

with the DEMPSTER DIGGSTER® GRD-101

The two photos above show some very important advantages you get when you use a Dempster-Diggster GRD-101. Photo directly above shows you why you have no truck shock with a Dempster-Diggster. You can lay bucket in truck body, trip latch and pull bucket up off load. Photo at right above shows you why you get a truck payload with a Dempster-Diggster . . . and how natural and easy it is to do so. This truck is now loaded to maximum heaped capacity, yet Dempster-Diggster has ample clearance. The dumping height is 9'6" and the digging height is approximately 15 feet. This enables the Dempster-Diggster to work with high dump equipment.

Other very important features of the new Dempster-Diggster GRD-101 include: AN EXCAVATOR THAT NEEDS NO WHEEL TRACTION (loading of bucket is accomplished by the exclusive Hydraulic Crowd and Hoist Action of the Dempster-Diggster) . . . TRUCK-SPEED MOBILITY TO AND FROM JOBS . . . AUTOMATIC BUCKET TRIP . . . MINIMUM TURNING RADIUS . . . THE SHOVEL WITH TORQUE CONVERTER . . . HYDRAULIC STEERING. Here's a shovel that gives you extra speed on the job and to and from jobs that means extra profits to you! Pound for pound, dollar for dollar, the Dempster-Diggster GRD-101 will out-dig and out-load any other available competing machine in tough going! Let us prove that statement! Write for complete information. Manufactured by Dempster Brothers, Inc.

DEMPSTER BROTHERS

DEMPSTER BROTHERS, 345 N. Knox, Knoxville 17, Tennessee

Limestone Salesmanship

(Continued from page 122)

a certain farm. If then the farmer wants it spread, charge him fifty cents an acre covered. Thus, a 6-ton truck load of liming material would cost the farmer $30 if it were merely delivered and dumped in a pile. If he wanted it spread on 3 acres it would cost him $1.50 more; if however, he wanted it spread over 6 acres it would cost him $3.00 more.

In my first paragraph I said, "If all the land were limed to neutrality." Now we all know this is not the case. In some areas not half the land has received any liming material, and much that has been limed sometime in the past is acid again. The task of the limestone salesman then would seem to be, each year, to include some of these underlimed acres in his campaign, and not neglect the land which was limed to neutrality a rotation ago. It may need lime again. Much of it will.

Many farmers have been taught that liming is a regular annual expense on the farm. He should continually be reminded that the money spent for lime yields the best dividends of any spent for farm expenses. When once a farm has been limed and as a result is growing good crops of alfalfa, call the neighbor's attention to this field and ask him if he does not want to get in on a good thing.

How to Increase Agricultural Limestone Sales

By J. A. STRITZEL AND H. R. MELDRUM*

AGRICULTURAL LIMESTONE SALES will not be increased until your sales efforts on this product are as great as your sales efforts on your other rock products! If limestone sales are important, why do so many producers think of limestone only as a "by-product" and hence give it "by-product" sales attention? And "left over" sales energy is not enough to move a product no matter how good that product may be.

Demand created for limestone by the federal programs of the "thirties" and "forties" did not take promotional sales work—it was only necessary to haul out the agricultural limestone. It was used in part because the government would underwrite a portion of the cost. Many farmers used agricultural limestone strictly on this basis. Because the use of liming material was often not tied to real benefits in the farmer's mind, he fell by the wayside when the federal "cost sharing" programs put relatively more emphasis on efficient use of agricultural limestone and fertilizer and on the importance of other soil improvement and conservation measures.

Farming Efficiency

Farmers are going to have to operate more and more efficiently in the future if they are to survive the pressures of high cost and lower returns. They will need to use every production tool that will help them achieve efficient production. From a fertility standpoint, they will need to know more about *what* nutrients and *how much* of those nutrients they need for a given level of production. They will ask more about the responses they can expect for application of liming materials and fertilizer. When these answers are obtained they need to be disseminated through educational and promotional programs.

One way to achieve efficiency in liming material and fertilizer use is to use good soil tests. Soil tests are definitely here to stay. It doesn't do the farmer any more good to put lime on a field that doesn't need it than to put on more of the material than is necessary. If the material is applied in excess of need, responses are not obtained and you *lose* a customer. What good then is all the public relations work?

The Need

Instead of hampering agricultural limestone use, emphasis on soil tests has helped to promote sound liming programs on our nation's farms. Furthermore, through the use of soil tests, we have been able to determine more exactly our total need for this material. For example, soil test summaries used in the Production Capacity Study conducted in Iowa in 1951 showed that nearly 50 million tons of average limestone were needed to bring the acid soils of the state to the proper pH level. In addition to this, there would be a maintenance need each year of nearly 4 million tons.

In contrast to these figures, the Iowa Department of Agriculture reports that about 1¾ million tons of liming material were applied in Iowa in 1953! If more farmers tested their soil, lime needs would become more apparent in the farmer's mind. The need is there—the problem is to make the farmer aware of the need. The greater use of reliable soil tests can help do this. Soil tests can be particularly helpful in a promotional program.

Promotional Programs

What should such a program consist of? First and foremost, it should point up very realistically how proper use of agricultural limestone can make profits for the farmer. What will liming acid soils do for the farmers in dollars and cents?

For example, on a liming experiment on an acid soil in southern Iowa, corn yields were increased 20 bushels in 1953 from a 3-ton application of lime made three years previously. In another experiment in northeast Iowa, alfalfa and red clover yields were increased by about a ton for a similar lime rate. The above increase in corn yield was worth $30. The immediate cost of the lime was approximately $10. Remember, however, that these results were obtained on an acid soil —not one which already had enough lime. It would take a soil test to differentiate between the two.

Liming acid soils increases the availability of soil phosphorus. It also stimulates greater bacterial activity which in turn is reflected in greater release of nitrogen and phosphorus from the soil organic matter. On very acid soils, liming reduces possible toxic effects produced by aluminum. Phosphorus absorption by plants is also increased on acid soils which have been properly limed.

Promotional Campaign

How does one go about setting up a promotional campaign to sell limestone? The same way that any other successful program is set up. Surely, one of the important first steps is to make the prospective customer feel that you are trying to help him—not yourself. That means setting a sound foundation for your program—a foundation based on real need for your material. Stress the use of the tool that will determine the need—(soil tests) so that when you apply the agricultural limestone the farmer obtains a response. If he obtains a response, he begins to believe that you are really interested in him.

Other steps are to make movies on agricultural limestone production, on how to use liming material most efficiently, and the results that can be obtained by proper use. The printed

(Continued on page 143)

*J. A. Stritzel, and H. R. Meldrum are Extension Agronomists at Iowa State College.

FACING A TOUGH PROPOSITION?

you can beat it

with **JALLOY**

JALLOY HEAT-TREATED STEEL PLATE BEATS WEAR DUE TO IMPACT AND ABRASION

Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy Aprons in Tyrock screen last 3 times as long as other steels

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

Jalloy Heat-Treated Plate is the special purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated, to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded.

Jalloy is available in three grades—1, 2, and 3 to meet various service requirements.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION — Pittsburgh

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

Jones & Laughlin Steel Corporation
3 Gateway Center, Dept. 481, Pittsburgh 30, Pa.

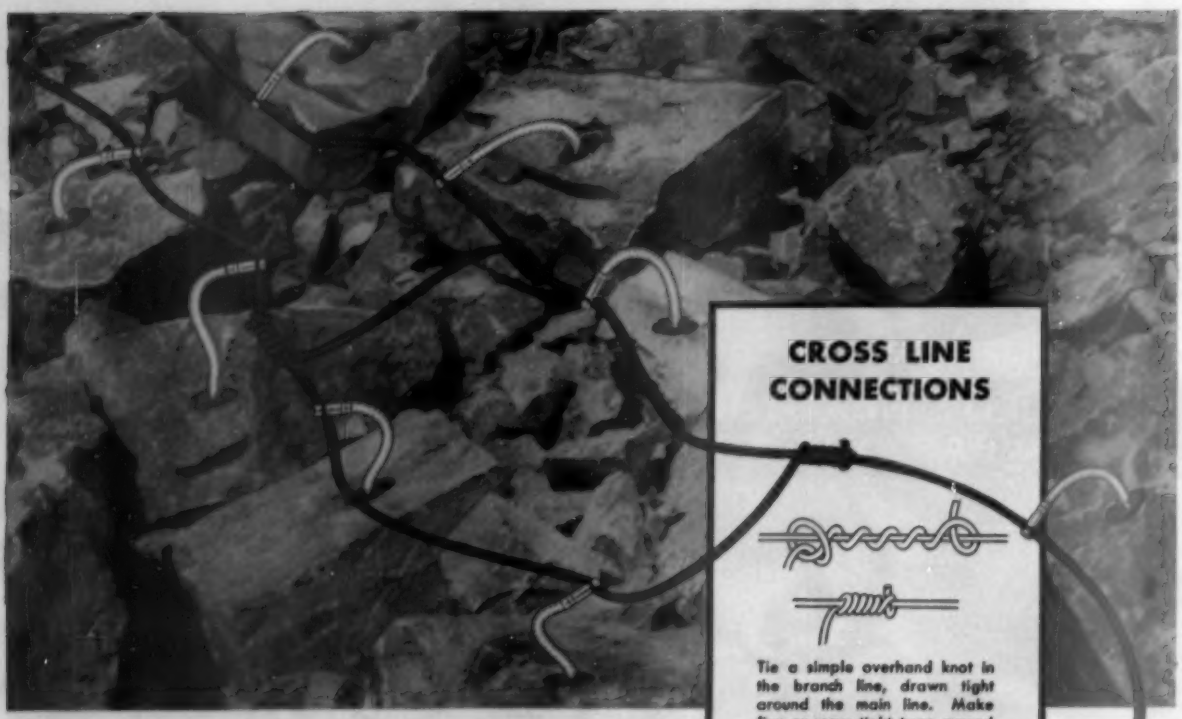
☐ Please mail complete data concerning Jalloy.
☐ Please have your representative call.

Name_____ Title _____

Company_____

Address_____

_____



CROSS LINE CONNECTIONS

Tie a simple overhand knot in the branch line, drawn tight around the main line. Make five or more tight turns around the main line and pull end tight through last loop.

MAIN LINE CONNECTIONS

Lay ends parallel and tie them together with two overhand knots, pulled up tight.

In block hole blasting with Safety Fuse, get the fire there — *faster with* Quarrycord

Big chunks in a rock pile can cover a lot of territory. You'd like to break them up "pop-pop-pop" in one operation. You want to be able to do this safely when it's convenient, even while thunderstorms threaten. And every man must be off the rock pile before the first hole goes!

All this is possible *now*. Use Ensign-Bickford Safety Fuse in each hole, and connect all fuses with *Quarrycord*.

Quarrycord is a flexible, water-resistant cord specially constructed to burn fast. An external flame travels along the Quarrycord at about one foot per second. A connector is crimped on the free end of each fuse and forms a positive connection for the Quarrycord.

It's very important to plan the hook-up so that each safety fuse has burned below the collar of the hole before the first charges fire. You can do this by using cross connections as shown at the right.

See your Explosives Supplier or write to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut
Manufacturers of Primacord® Detonating Fuse, Safety Fuse, Ignitacord®, Blasting Accessories.
Established 1836

ENSIGN-BICKFORD

Quarrycord

for lighting Safety Fuse in Secondary Blasting

G-1

INFORMATION

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

1 **AIR POWER SYSTEM** — Ingersoll-Rand Co. has brought out Form 213-A entitled, "A Better Air Power System," giving a step-by-step procedure to bring the system up to accepted standards. The booklet also aids in the design of new systems, and contains diagrams of different types of piping networks and tables of friction losses of air in pipe, fittings and hose.

2 **ALLOY STEELS**—Climax Molybdenum Co. has released a 200-page handbook entitled, "Alloy Steels Pay Off." Advantages are discussed, and over 60 case-histories are presented, regarding the use of alloy steels in modern equipment design.

3 **AUTOMATIC STOP CONTROL**—Allis-Chalmers Manufacturing Co. has issued a leaflet, No. 07B8141, describing and illustrating an automatic stop control for vibrating equipment. Operating details are also included.

4 **BAGGER**—Richardson Scale Co. has brought out a data sheet, No. 5301, describing and illustrating its manually-operated grass bagger. A dimensioned engineering drawing shows top and side views, and a typical bagging operation is described. Specifications, material flow control descriptions and special applications are also given.

5 **BLOCK MACHINES**—Bergen Machine and Tool Co., Inc. has announced a catalog entitled "Better Equipment for Block Plants," describing improvements developed over the years for block machines, as well as plant operation and maintenance equipment.

6 **BODY AND HOIST EQUIPMENT**—The Heil Co. has brought out Bulletin BH-54120, describing and illustrating its entire line of truck equipment. Dump bodies, twin arm hoists and lightweight telescopic hoist are described. Typical application photographs and specifications are included.

7 **BOILERS** — Wm. Bros Boiler and Manufacturing Co. has published Bulletin WT-8, pointing out general design and construction features of the "S" series of boilers. Data and specifications are given on each model and size.

8 **BULK HANDLING SYSTEM**—The Gifford-Wood Co. has issued a reprint entitled, "Bulk Handling System Cuts Cupola Charging Costs." The reprint illustrates and describes a bulk handling system for handling slag and coke. Schematic line drawings are also included.

9 **BULLDOZER BLADES**—International Harvester Co. has released a 24-page catalog, describing hydraulic bullgrader and bulldozer blades matched to International T-6, TD-6, T-9, TD-9, TD-14A and TD-18A crawlers. Specifications and typical application photographs are included.

10 **CARTRIDGE ROLLER BEARINGS**—Rollway Bearing Co., Inc. has issued a four-page catalog describing a self-contained cartridge roller bearing for use on industrial materials handling equipment. Shaft and housing dimensions are listed and bearing radial load ratings are given at 100 r.p.m.

11 **CLEANING SYSTEMS**—Wilson Engineering Corp. has published Bulletin 50, describing and illustrating Woodruff Syphon Jet cleaning systems for heavy-duty use. Applications are outlined and recommended basic cleaning techniques are given.

12 **CLINKER BREAKER** — Allis-Chalmers Manufacturing Co. has issued Bulletin 07B8202, describing and illustrating a clinker breaker designed as auxiliary equipment for its air-quenching clinker cooler. Operational data is included.

13 **COAL VALVE**—Stock Equipment Co. has released Bulletin 97, describing the S-E-Co. coal valve. Installation data, engineered diagrams and dimension tables are included, as well as a list of accessories.

14 **COLLOIDAL GRAPHITE**—Acheson Colloids Co., Division of Acheson Industries, Inc., has released Bulletin 421, containing photographs, diagrams, charts and data on the advantages of 'dag' colloidal graphite in the assembly and run-in of machines.

15 **COMPRESSION TESTERS**—Forney's Inc. has announced Bulletin 505, describing and illustrating its line of compression testing equipment for various types of concrete products, including building units, cylinders, cubes, beams, lintels, pipe and brick.

16 **CONCRETE BATCHING**—C. S. Johnson Co. has published a reprint, form No. KJ414, discussing fundamental principles of "Concrete Batching and Mixing." The 44-page booklet is divided into eight chapters and has such topics as portable and semi-portable batching plants, single and multiple materials batchers, weigh-beam and scale adjustment, permanent plant facilities and controls for large, mass concrete plants.

17 **CONCRETE DENSIFIER**—Sika Chemical Corp. has brought out a bulletin describing Sikacrete, an accelerating densifier for concrete and mortar. Advantages, mix design, physical properties, application, instructions for use, etc. are included.

18 **CONCRETE EQUIPMENT**—Stow Manufacturing Co. has published Catalog 552, a 16-page illustrated booklet, describing and illustrating the line of concrete equipment such as universal electric and gasoline concrete vibrators, portable concrete grinders, rotary trowels, and concrete vibrating screeds.

19 **CONCRETE PIPE HANDLER** — Silent Hoist and Crane Co., Inc. has released Bulletin 81, describing and illustrating the "Silent Hoist" Liftruk concrete pipe handler. Typical application photographs are shown.

20 **CONCRETE VIBRATORS**—Vibro-Plus Products, Inc. has released Bulletin 551 on its line of gasoline, electric and pneumatic concrete vibrators. The "Rollgear" vibrator head is also described.

21 **CONTRACTOR'S DUMP BODY** — The Heil Co. has released Bulletin BH-55101, giving construction and design details of the SL-11 contractor's dump body. A photograph and line drawing point out the features, and specifications and a listing of optional equipment are given.

22 **DIESEL ENGINES**—General Motors Corp., Detroit Diesel Engine Div., has issued a brochure describing the operation of "6-110" diesel engines, and illustrating industrial and marine models in the series from 200 to 575 hp. Entitled, "Power for Progress," it covers design features, specifications, power curves, and typical application photos.

23 **DRYING, SIZING, HEAT TREATING**—Dorr-Oliver Inc. has released Bulletin 7502 entitled, "FluoSolids Systems for Drying, Sizing, or Heat Treatment." It describes the operation, advantages, theory, background and typical applications of the systems. A typical unit is illustrated.

24 **EDDY-CURRENT BRAKES**—Eaton Manufacturing Co., Dynamatic Div., describes and illustrates standard dynamatic air and liquid cooled eddy-current brakes in Bulletin BR-1. Construction details, capacities, characteristic curves, dimensions and advantages are listed.

25 **ELECTRICAL INSTALLATIONS**—Patterson-Emerson-Comstock, Inc. has prepared a 44-page booklet, illustrating and geographically describing recent electrical installations by the company, including power generators, line transformers, and industrial equipment in mining and other heavy industries.

26 **ENGINES**—Westinghouse Air Brake Co., Le Roi Div., has published a catalog, No. E-9, describing and illustrating the 115 to 410 hp. Le Roi L3000, H2000, and F1500 engines. Cutaway views and photographs are given, as well as basic specifications.

Fill Out Reverse Side — MAIL TODAY

FIRST CLASS
PERMIT NO. 1417
Sec. 34.9 P.L.&R.
CHICAGO, ILL.

BUSINESS REPLY CARD

No Postage Stamp Necessary If Mailed in the United States

—POSTAGE WILL BE PAID BY—

ROCK PRODUCTS

309 WEST JACKSON BOULEVARD

CHICAGO 6, ILL.

FREE ! Information on

NEW LITERATURE

about your business

USE COUPON BELOW

27 **EQUIPMENT SERVICING** — Caterpillar Tractor Co. has released Form D522, describing the company's shop and field services for Caterpillar equipment. Photographs of typical operations in the shop and in the field are included.

28 **EXCAVATOR-CRANES**—Hyster Co. has brought out Form 1235, a 20-page brochure describing and illustrating the Hysteway excavator-crane mounted on Caterpillar D6, D7 or D8 track-type tractors. Specifications, lifting capacities and operational features are given.

29 **FRONT END LOADER**—Sherman Products, Inc. has brought out a booklet describing a front end loader for Fordson Major diesel tractors. Two models are described and illustrated, the AJ-25, with 2500-lb. capacity, and the AJ-20, with 2000-lb. load capacity. On-the-job illustrations are given, along with special accessories, features and specifications.

30 **FUEL INJECTION EQUIPMENT**—Caterpillar Trator Co. has brought out Form DE580 entitled, "Six Money Saving Facts About Caterpillar Fuel Injection Equipment," explaining the production and design of fuel injection equipment. Among the features discussed are interchangeability of parts, ease of maintenance, and adjustment free design.

31 **GRAB BUCKET CRANES**—Harnischfeger Corp. has released a 24-page bulletin, No. C9-3, describing and illustrating P & H grab bucket cranes. Clearance dimensions are given, and typical applications in various operations are pictured.

32 **GRAVIMETRIC FEEDER** — Omega Machine Co. has issued Bulletin 30-H12A, entitled, "Loss-In-Weight Gravimetric Feeder for Dry Materials." Included are photographs and a diagram of the feeder's principal parts. Data is also given on operation, feed range, components and accessories.

33 **HARD-SURFACING**—Rankin Manufacturing Co. has brought out a catalog, Form B-5, giving the advantages and method of application of its hard-surfacing welding materials. Illustrations and selection data are also included.

34 **KILN HOT-ZONE LINING**—Kaiser Aluminum and Chemical Sales, Inc., Kaiser Chemicals Div., has published a 36-page booklet entitled, "Basic Hot-Zones for Cement Kilns," giving technical data on the use of periclase-chrome refractory brick to line cement kiln hot zones. Tables, illustrations and installation data are also included.

35 **LIQUID LEVEL MEASUREMENT**—Minneapolis-Honeywell Regulator Co., Industrial Division, has issued Bulletin 1161, giving a discussion of the basic principles of liquid level measurement, control, and transmission. Systems are described, along with applications, principles of operation, limitations and advantages.

36 **MAGNETIC SEPARATORS**—Dings Magnetic Separator Co. has issued a four-page brochure, Bulletin B-1500, covering the application of the full line of wet magnetic separators, covering both concentration and separation service. Descriptions and functions of Alnico and electromagnetic drum type separators are given, as well as the line of belt type separators.

37 **MATERIALS HANDLING**—Clark Equipment Co. has published a 24-page issue of "Material Handling News," featuring case histories of installations of straddle carriers and fork trucks in various industries. Recent developments and new products in the materials handling field are also described and illustrated.

38 **METAL CASTINGS** — American Brake Shoe Co. has announced an eight-page booklet, describing ABSCO metal castings. Material characteristics, properties, and engineering data are given. Typical applications are pictured.

39 **MIXER CHUTE CONTROL** — Monarch Road Machinery Co. has released a brochure describing and illustrating the "Dyna-Chute Kit," hydraulic mixer chute control for installation on transit mixers.

40 **MOTORS**—Reliance Electric and Engineering Co. has released a 12-page, illustrated booklet, entitled "Check the Facts," pointing out 100 characteristic facts of the line of totally-protected a-c motors.

41 **PARALLEL SHAFT GEAR DRIVES**—Link-Belt Co. has announced a 32-page book, No. 2619, describing and illustrating a complete line of parallel shaft gear drives. Listed are 39 standard size drives, with engineering data, including horsepower tables, dimensions, and overhung load capacities.

42 **PNEUMATIC CONTROL — TRANSMISSION SYSTEMS** — Minneapolis-Honeywell Regulator Co., Industrial Div., has issued Bulletin 1120, describing pneumatic transmission systems and cascade, ratio and other interconnected control systems. Pneumatic controllers are described and data on tuning pneumatic controllers to a process, how to introduce manual adjustments and how to provide the best air supply are given.

43 **PORTLAND CEMENT**—Medusa Portland Cement Co. has issued a technical bulletin on its high early strength portland cement. Specifications and complete details for proportions and mixing are given, and illustrations show examples of construction using the product. Federal and A.S.T.M. specifications are also given.

44 **REPOINTING**—American Manganese Steel Div.,. American Brake Shoe Co., has released Booklet WA-77, incorporating late developments in repointer design and welding rods for attaching or hardfacing the teeth. A step-by-step procedure is given, and a chart shows sizes for various styles as well as suggested uses for manganese steel bars, flats and plate.

45 **SAFETY EQUIPMENT** — Wilson Products, Inc. has announced a general catalog on industrial safety equipment. Four major sections on eye, head and respiratory protection and welding illustrate and describe the various equipment.

46 **SILICONE PAINT**—C. H. Dregert Co., Inc. has released a six-page, illustrated brochure on Sil-Kool, a heat, rust and corrosion-resistant silicone paint for red-hot surfaces that is said to withstand up to 1600 deg. F., and extreme weather exposure.

47 **SKID-SHOVEL**—Drott Manufacturing Corp. has published a catalog describing the International Drott "Four-In-One" skid-shovel. Specifications, action photographs and drawings illustrating operation are included.

48 **TANKS**—Denver Equipment Co. has published a 16-page bulletin, No. T2-B5, illustrating and describing wood, steel and rubber-covered tanks. Construction, dimensions, specifications and prices are given for bolted steel tanks, thickener tanks, tray tanks, etc., as well as a description of overflow launders.

49 **THERMOCOUPLES-PYROMETERS**—The Bristol Co. has published a 56-page bulletin, No. P1238, on thermocouples and pyrometer accessories. About 165 photos and line drawings illustrate suggested installation techniques and accessories. Thermocouple calibration tables are also included.

50 **VARIABLE SPEED PULLEYS** — Equipment Engineering Co. has published an eight-page brochure describing Hi-Lo automatic variable speed pulleys and the Hi-Lo system. Advantages are outlined, and specifications, speed range tables, cutaway views and typical application photographs are included.

51 **VERMICULITE CONCRETE** — The Vermiculite Institute has brought out a folder, containing literature giving data and information on the design and fire-resistance of machine applied vermiculite concrete walls. Also included is a report on a 4¼-in. nonbearing reinforced vermiculite concrete spandrel wall, as given by Underwriters' Laboratories, Inc.

Detach and Send Us This Post Card

ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill. (RP 4-55)

I would like to have the items circled

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51									

(Please print or typewrite name and address)

Name _____ (Position) _____

Street _____

Company _____

City & State _____

Use USS Lorain Rolled Plate Linings

to reduce mill "downtime" and cut grinding costs

● One of the biggest robbers of your grinding profits is probably "downtime" for repairs and replacements necessitated by plate failure or bolt breakage. You can lessen costly downtime in your mills by using USS Lorain Rolled Plate Linings. These rugged *rolled steel* plates give extra long service compared to ordinary castings. And they are interchangeable . . . heat treating compensates for localized wear. The special-composition, heat-treated bolts are virtually break-proof and last the long life of the plates.

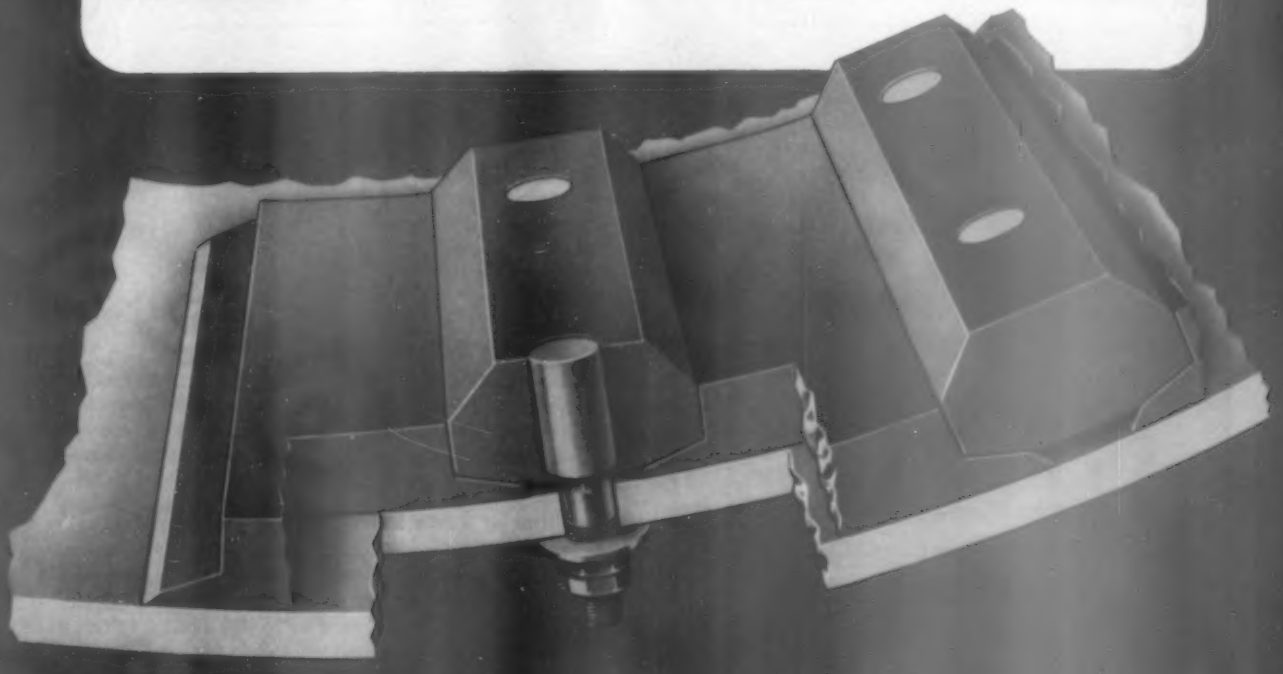
When you use USS Lorain Rolled Plate Linings you get closer tolerances between plates and between plates and lift bars, giving you a tighter overall lining. This means no more shell wash and allied troubles that can ruin the mill itself.

Not only is frequency of replacement reduced with USS Lorain Linings, but the time involved in the actual replacing is less, because these plates are accurately made to size . . . they go in easily, quickly.

Protect your grinding profits. Write to us today for the names of leading mill manufacturers who can supply you with USS Lorain Rolled Plate Linings—for wet or dry grinding.

USS Grinding Balls are designed for economical grinding too. Continual quality checks throughout their production assures you of balls that will take long, rough wear evenly. Sizes from ¾" to 5".

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.



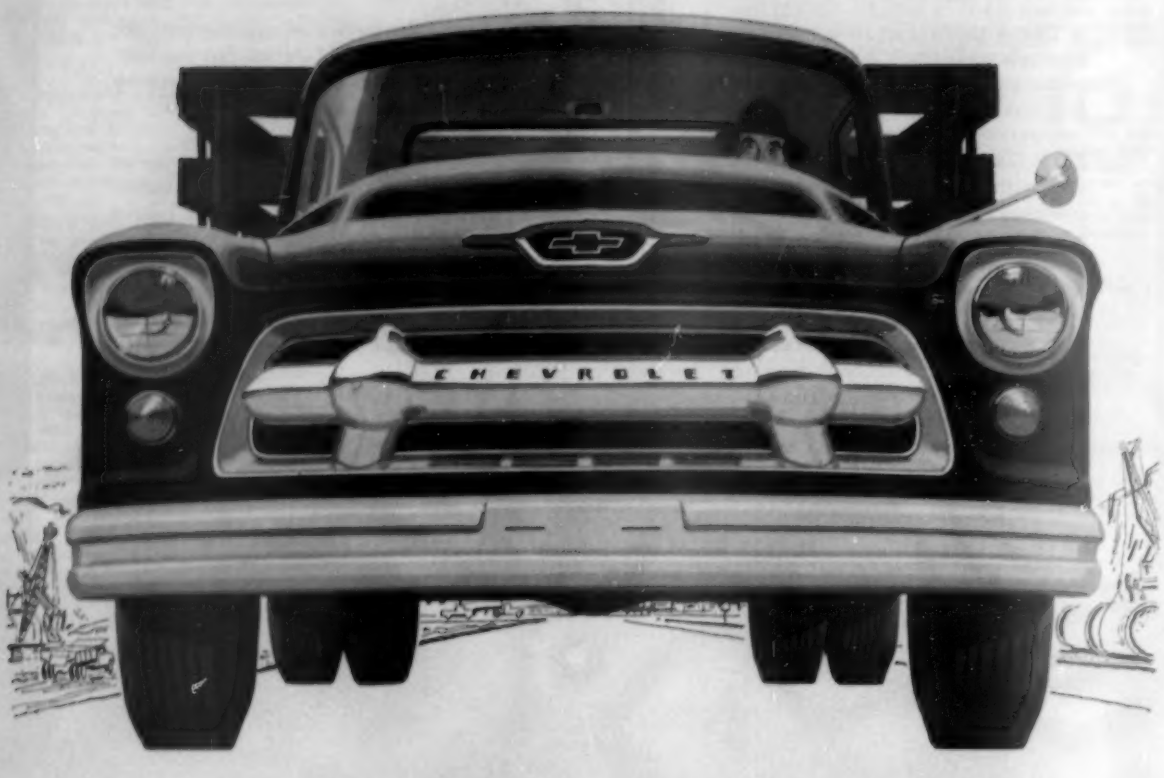
UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

USS

UNITED STATES STEEL

THEY'RE HERE! NEW CHEVROLET



New models . . . more models . . . higher G.V.W. Designed and built the way you can count on Chevrolet, the leader, to build them. Ready to do more jobs. Do 'em faster. Do 'em better. And do 'em with new economy.

Dressed for a new bonus

For the first time in any truck line, *two* distinctly different styling treatments are offered by Chevrolet. One in light and medium models, another in heavy-duty. Each is a new, profitable advertisement-on-wheels for you and your business.

Measured for a new savings

Makes a whale of a difference to get a truck that fits the job. And in Chevrolet you get it! With 75 different models, all having the industry-standard 34-inch frame width . . . 15 wheelbases, ranging to 220 inches . . . three different chassis types, conventional, forward control, low cab forward . . . and with maximum G.V.W.'s upped to 18,000 lbs.—Chevrolet's new line of Task-Force Trucks offer the *exact* truck to do the job you

THEY'RE HERE! NEW CHEVROLET

Task-Force TRUCKS

CHEVROLET

need done . . . with operating costs lower than ever!

There's new Overdrive for even bigger gas savings on ½-ton models . . . proved truck Hydra-Matic on ½-, ¾- and 1-ton models—each optional at extra cost. And now, as standard equipment, Power Brakes are featured on 2-ton models (optional on all others) and Tubeless Tires are standard on ½-ton models.

Powered for economy

Whether you deliver door-to-door or haul state-to-state, Chevrolet's *six* new "high-voltage" engines offer the right power-combination for dependable, economical performance on every job. All are of efficient valve-in-head design with high compression ratios. All feature the surer kick-off and bigger generator capacity that only Chevrolet's new 12-volt electrical system delivers.

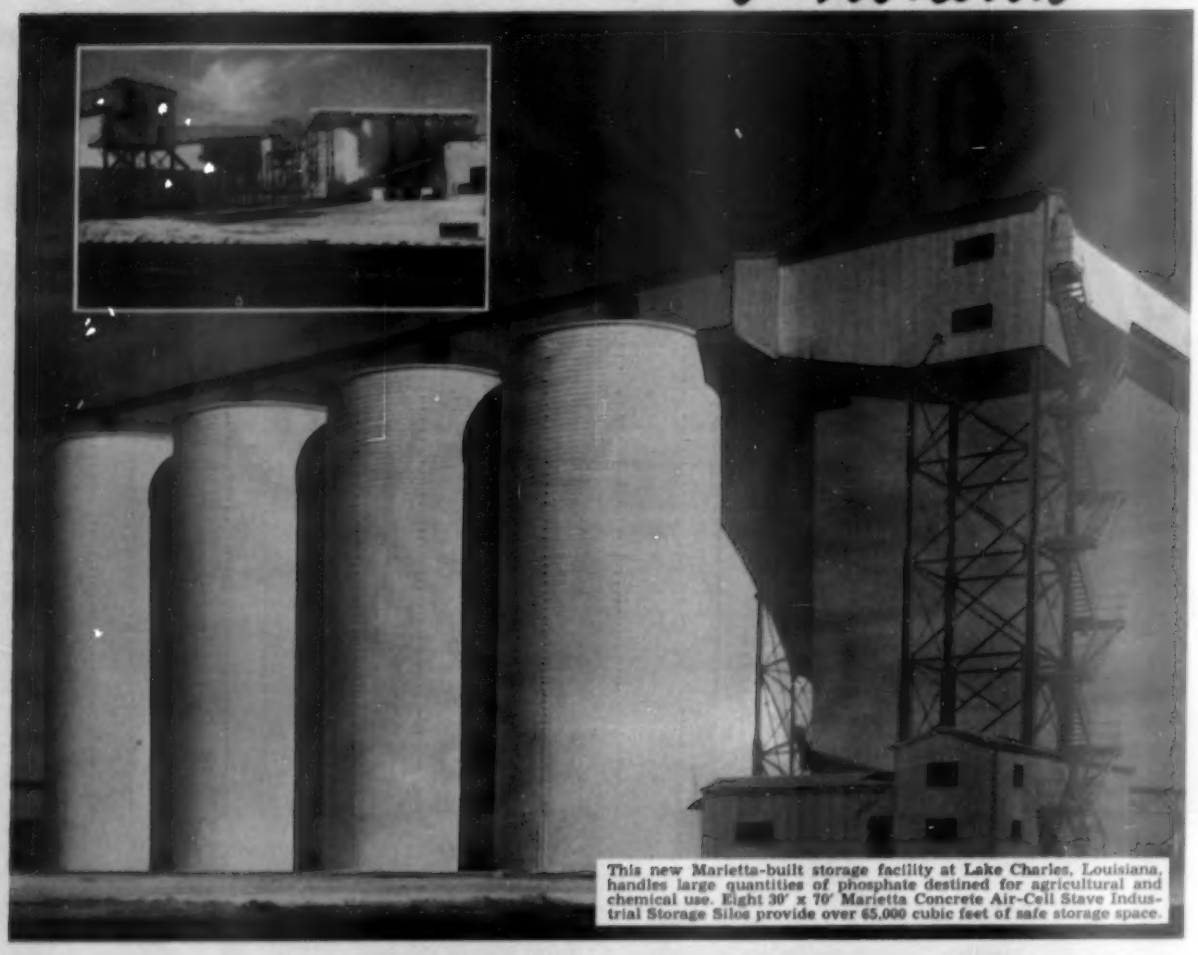
Chevrolet's new "under-the-hood" features are almost endless. Engine mountings are completely redesigned, cooling and lubricating systems made more efficient, fuel system improved . . . on and on they go, setting a new pattern for the truck industry.

Investigate without delay

So revolutionary are the many new and profitable features advanced by Chevrolet's new Task-Force that truck users everywhere should see their Chevrolet dealer today. Learn the complete story and get started on your way to better trucking. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Task-Force TRUCKS CHEVROLET

protect your production . . . with Marietta



This new Marietta-built storage facility at Lake Charles, Louisiana, handles large quantities of phosphate destined for agricultural and chemical use. Eight 30′ x 70′ Marietta Concrete Air-Cell Stave Industrial Storage Silos provide over 65,000 cubic feet of safe storage space.

CONCRETE INDUSTRIAL STORAGE SILOS

Give valuable materials the protection they deserve in moisture-free, fire-safe, adaptable Marietta Concrete Stave Silo Storage Systems.

Even hurricane-whipped rains cannot penetrate the walls of Marietta storage installations . . . an invisible barrier of silicone waterproofing effectively seals pores in the concrete exterior coating . . . eliminating formation of destructive efflorescence and reducing weathering and spalling. In addition to effectively lengthening the life of exterior finish coating, silicone treatment prevents ugly staining by soot or chemical dusts.

Marietta Concrete Storage Systems are designed by experts in industrial materials handling. Your operations can benefit from Marietta's wide experience . . . write or wire today . . . you'll be pleasantly surprised to find how economically these cost-cutting, efficient storage systems can be supplied . . . yet "tailored" to your own specific needs! Send for your copy of our silo storage catalog.

Marietta, Air-Cell or solid concrete staves may be SILICONE COATED for extra long life

Precast Concrete Products for Farm, Home and Industry

THE Marietta CONCRETE CORPORATION Marietta, Ohio

BRANCH OFFICES: 501 Fifth Ave., New York 17, N. Y.; Pulaski Hwy. at Race Rd., Baltimore 21, Md.; 411 Foster St., Nashville, Tenn.; Box 5197, Charlotte 6, N. C.; Hollywood, Fla.; Box 592, Jamestown, N. Y.
REPRESENTATIVES in principal cities.

How to Increase Sales

(Continued from page 134)

and spoken word over radio and television is important. Promote the knowledge of the direct and indirect effects of liming—how nutrients are made more available, how microbial activity is stimulated, how legume stands are improved, etc. In short the farmer still needs to be sold on the idea that agricultural limestone if he needs it is one thing *he cannot do without.*

Producer's Responsibility

First and foremost is the need for a good product. How much of your material will pass a 50 mesh sieve? Twenty percent? Thirty? Forty? Fifty? Sixty percent? If your rock has a low calcium carbonate content, do you try to crush the rock finer so as to make more of it quicker acting in the soil? In general, there are more "fines" in limestone today than 20 years ago, but there is still room for improvement. The finer the agricultural limestone the more quickly acidity is corrected and the sooner the farmer sees results.

Agricultural limestone has no substitute. The need is present—the difference between need and the present use is tremendous. Nevertheless, farmers on acid soils still grow good crops. However, they don't know that those crop yields could be higher if the proper amount of liming material were applied. It will take a positive, vigorous, sound educational and promotional program on the part of limestone producers to make the farmer aware of the benefits to be gained.

Liming of Acid Soils Only Start of Conservation Program

By C. J. CHAPMAN

LIMING OF ACID SOILS is the starting place in a program of soil conservation. First of all, let's consider the use of lime from the standpoint of erosion control. Yes, it's true the liming of erodable acid cropland in the state of Wisconsin, and the establishment of perennial legumes such as alfalfa on our hillsides in a program of long time soil conservation has already added years and years of life and productiveness to our farm land. It was President Franklin D. Roosevelt who some twenty years ago, made this statement, " The history," he said, "of every nation is eventually written in the way in which the people of that country care for their soil." This statement was made back in the early thirties when the soil conservation service was being formulated and its vast program of preserving the greatest of all national assets was getting underway.

It was back in those days that we of the extension service sponsored a program of agricultural limestone production. Set up first in the fall of 1933 under CWA and converted as a part of our drought relief program under FERA in 1934, it was converted again in 1935 to a WPA work project. We turned out millions and millions of tons of low cost lime to Wisconsin farmers. True, the program was supported all this time by the AAA and PMA with cash credit given to farmers for lime as a soil building practice. The action agencies of the SCS and as well, FSA, in fact other agencies, federal and county, right down to the present county sponsored ASC program, have all cooperated in this program of supplying agricultural limestone to farmers at low cost. Actually, this program has contributed many millions of dollars in new wealth and as well, good health to livestock on Wisconsin farms in these past 22 years.

Two years ago I pleaded for a continuation of incentive payments for agricultural limestone under the ASC program and I'm still pleading for a broadening of soil building credits for the use of agricultural limestone under this program. For years and years, we of the agricultural colleges have come to recognize liming of acid soils as a basic factor in soil building and conservation.

Emil Truog, Emeritus Professor of Soils of the University of Wisconsin, who has devoted a lifetime to the study of soil acidity and its relationship to the production of agricultural crops, contends that credit for agricultural limestone under the ASC Program should be given for its use anytime, anywhere to any field on the farm where soil tests indicate that lime is needed and where and whenever it is convenient for the producer to haul it out and spread it. I heartily agree with Professor Truog and others who argue for this broader base in our program of credit for liming material under the ASC.

There's no question about it — the use of agricultural limestone (30 million tons of it has been applied to Wisconsin farm lands in the past 20 years) to sweeten the acid soils of this state has been a most important factor in pushing the acreage and as well, the yields of alfalfa to the present all-time high.

The state of Wisconsin in 1951 and again in 1954, harvested the largest crop of tame hay for any state in the United States. Nine and one-half million tons in 1951, 8½ million tons in 1952 and again 1953 and 1954 have been record years. Likewise, our alfalfa acreage has topped every state in the United States — and you'll agree that we've done a pretty good job when it comes to growing record crops of hay and especially alfalfa. *But there are still thousands of acres of acid soils* in Wisconsin in need of lime. Last year a total of some 240,000 soil samples were tested in our state and county soil testing laboratories. Records show that over 50 percent of these samples were still acid and in need of more lime. True, many of the fields from which these samples were taken had been limed once — some of them twice, but the tremendous demand for lime by these lime-loving crops, alfalfa and clover, had used up the available lime and they have become acid again. Many fields were not limed at heavy enough rates at the outset; in fact, rather coarse grades of lime were applied, and of course, after six-eight-ten years of cropping, they need more lime. The job of liming is never done.

For Topdressing Old Alfalfa Fields

What about applying agricultural limestone as a topdressing for old alfalfa fields that are showing some yellowing in color? Of course *soil tests are the best guide* in determining whether or not the soil in these fields is acid. The first thing I suspect when I see a field of yellow alfalfa, especially first crop alfalfa, is soil acidity. I have seen alfalfa in sort of waves and in bands eight to ten feet wide, good alfalfa and then in between, poor yellow alfalfa. And soil test usually tells us what that's due to. Yes sir, the big spreader trucks when they were spreading the lime, didn't lap enough. In other words, the good alfalfa was growing on soil that had received the fine, dust particles (right back of the spreader truck) but the poor alfalfa in between was where the coarse buckshot material had been thrown. Soil tests invariably indicate a need for more limestone in the poor streaks. In other words, the coarse buckshot material wasn't fine enough to neutralize soil acids. So we say, topdress these old alfalfa fields with a good grade of agricultural limestone. I would advise liming these fields this

(Continued on page 162)

NEW

GARDNER-DENVER WATER-COOLED ROTARY 600

Another triumph of Gardner-Denver engineering—the great new Rotary 600 gives you the basic rotary advantages of extra compactness and portability—*plus* exclusive Gardner-Denver quality features that assure new *ALL-WEATHER* utility—new operating economy —new and simplified serviceability on the job.

COMPACT AND PORTABLE

Check these specifications — two-stage, multivane compressor. Parallel cylinders cast in one block. Weight: 8,700 pounds ready for operation. Width: 5' 11". Height: 8' over canopy. Length: 11' 2". Turning radius: 14'. General Motors Diesel Engine Model No. 6-71—1800 r.p.m. Electric starting. Send now for all the facts.

MORE NEW ADVANTAGES THAN ANY OTHER ROTARY

New Reliability in Any Weather—

* All weather's the same to the Gardner-Denver Rotary 600—from equator to pole—at 40 below or 115 in the shade.
* WATER-COOLING assures ALL-WEATHER operation. Exclusive water circulating system maintains constant operating temperature for both compressor and engine—automatically—under all climatic conditions.
* Cold weather engine starting's a cinch. Finger-tip hydro-shift clutch disengages compressor load.
* No dry starts—engine water warms up compressor oil before clutching in.

New Lubrication Protection—

* Positive lubrication, sealing, and cooling under all operating conditions—through metered oil flow.
* Best operating temperature automatically maintained by water-cooled oil system.
* Condensation cannot contaminate oil or freeze up oil circulation—it's all removed from the system.

New Operating Economy—

* Economical fuel demand—longer compressor and engine life—are assured by the Thriftmeter—Gardner-Denver's simple, automatic speed control.
* Vibrationless operation saves wear and tear. Compressed air is delivered steadily—without pulsation.
* Air hose and tool life extended by dry, oil-free air from Rotary 600

New Simplified Maintenance—

* It takes only *minutes* to remove all compressor vanes for inspection or replacement. No costly compressor let-down time.
* Field maintenance simplified by inspection covers providing access to all vital parts.
* No metallic contact between rotors and cylinders.

FOR EXTRA UTILITY, QUALITY, ECONOMY AND DEPENDABILITY . . .
CHOOSE THE GARDNER-DENVER WATER-COOLED ROTARY 600

ONLY GARDNER-DENVER GIVES YOU THIS CHOICE!

Now Gardner-Denver Company helps you choose between a rotary or piston portable compressor. Whether your work calls for the Rotary 600, or the WH-600D—your best bet is a Gardner-Denver.

FAMOUS GARDNER-DENVER WH-600D

Veteran of tough construction projects throughout the world—the Gardner-Denver piston 600 is easy to start—simple to operate—runs 6000 *plus* hours before overhaul—has Thriftmeter fuel and oil economy.

GARDNER-DENVER Since 1859

KELLER TOOLS

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., 14 Curity Ave., Toronto 16, Ont.

Directors and officers of the Iowa Agricultural Limestone Association

• Iowa Agricultural Limestone Association annual convention sets up special committee to develop ideas which will stimulate demand for agricultural limestone

Iowa Agstone Producers Consider Ways to Increase Sales

IN SPITE OF A STORM that hit northeastern and northern Iowa, the annual convention of the Iowa Agricultural Limestone Association recorded a registration of 340 members and guests. The Board of Directors' meeting preceded the convention. At this meeting, it was decided to hold a statewide meeting to be called by a committee appointed by President Raid to discuss the problem of falling sales of agricultural limestone and to develop ideas which will stimulate demand. During the same day or the following day, a joint meeting will be held with the representatives from Iowa State College and the State ASC Committee.

At 8 p.m. on February 23, the associate members presented a new idea in entertainment rather than the customary reception. Given the intriguing title, "A La Quarry Parisian," the entertainment included several excellent vaudeville acts in one of which some of the producer and associate members participated. A number of distinguished guests attended the annual luncheon the following day, including: Lt. Governor Leo Elthon; Clyde Spry, secretary of agriculture for Iowa, M. L. Abrahamson, state treasurer; Floyd Andre, dean of agriculture, Iowa State College; John H. Riddle, president of N.A.L.I.; Kenneth Thatcher, secretary of the Iowa Farm Bureau Federation; Dwight W. Myer, chairman of the State ASC Committee; and Robt. M. Koch, executive secretary of the N.A.L.I. Lt. Governor Leo Elthon is a member of the Iowa association and a limestone producer. Wilbur Schield of Waverly, Iowa provided the main speaker who was introduced as Miss Diane Windsor, stage and screen actress. At the end of the program, the screen actress removed a wig and revealed his real identity as Martin David Hughes, well-known impersonator. The annual buffet dinner and dance was held in the evening.

New Officers

Wood W. Weaver, of the Weaver Construction Co., Alden, Iowa, was elected president of the association; Roy A. Potthoff, of Kaser Construction Co., Des Moines, Iowa, was elected vice-president. The newly elected directors are: K. K. Kinsey, Concrete Materials & Construction Co., Cedar Rapids; Ben Ravitz, Wapello Stone Quarries, Ottumwa, Iowa; and W. A. Schemmer, Schemmer Construction Co., Logan.

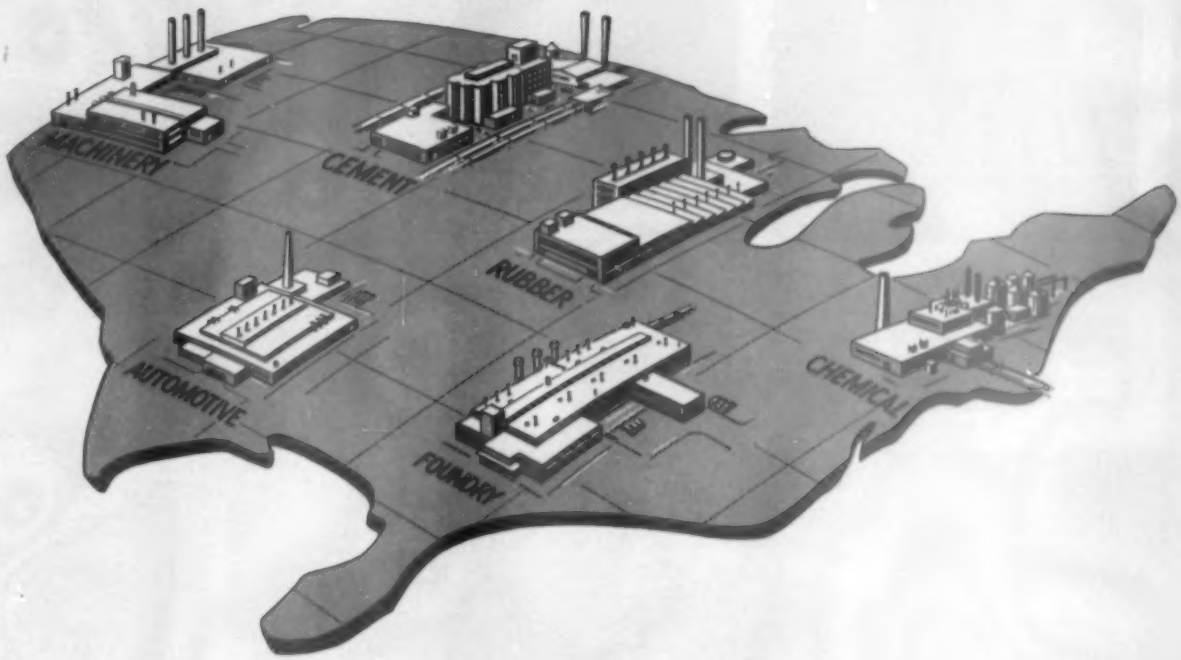
Business Session

President Raid opened the business session with an address of welcome, and introduced D. Llewellyn Heard from the Standard Oil Company laboratory who gave a fine demonstration entitled, "Fire Magic." Clint A. Allen, executive secretary-treasurer gave his annual report in which he described the 46 Series of seven posters being used by producers as part of the promotion program of the association. He also told about the group insurance plan in which 171 policies are now in force. John Stout of Triangle Construction Co., and chairman of the auditing committee, presented his report. K. R. Farquhar of Farquhar Quarries, chairman of the resolutions committee, acted for Paul M. Nauman who could not attend due to illness in the family. Among other matters, the resolutions authorized the secretary to work with Gibson Holliday of the Road Surfacing Contractors and O. W. Crowley, executive secretary of the Iowa AGC to secure corrective measures in the Iowa legislature covering laws as they affect quarry scales; to present the case of the producers before the Iowa legislature on bill H.F. 398 limiting amount of explosives to be transported by truck; and to work for the repeal of section 348 of the Agricultural Acts of 1938 which, as it now stands, prohibits farmers from participation in the ACP if certain specified acreage allotments are not adhered to.

Dewey Cornell, program director of the State ASC Committee gave a talk on "The Limestone Producers Stake in the ACP Program." Mr. Cornell presented some fine ideas on promoting the sale of agricultural limestone and emphasized the need for good public relations with the county committees. Dean Floyd Andre of Iowa State College spoke on the subject, "Meeting the Challenge," which stressed the need for better conservation of our soil to assure the production of more food for our growing population.

Kenneth C. Thatcher, secretary of the Iowa Farm Bureau Federation, had for his subject, "Are We Buying or Building Friendship in Europe." Mr. Thatcher presented a very interesting picture of conditions as he found them on a recent trip to Europe.

E. R. Severs spoke on the subject, "Don't Let Income Taxes Deplete Your Profits." Mr. Severs gave some good advice in figuring income taxes, and after his talk answered many questions from the floor.



Who Uses Professional Engineering Services?

Manufacturers, large and small—in all fields of industry, are turning to professional engineering for better manufacturing methods, better processing facilities, and to increase output and lower production costs. For more than thirty years Giffels & Vallet Inc. has provided a comprehensive planning and engineering service to a widely diversified group of industries. This flexible service can be used to plan and engineer a complete industrial installation, or to supplement and work in cooperation with the client's engineering department.

Whether it's a complete new plant, or the modernization of present facilities — automated machinery, materials handling equipment, equipment design, or process development—Giffels & Vallet Inc. offers a complete professional service to meet the specific requirements of each individual client. These services are set forth in a special Planning Brochure. A copy will be mailed on request.

Engineers and Architects serving Industry for over 30 Years

NEW YORK
CHICAGO
HOUSTON
WINDSOR, ONT.

INDUSTRIAL ENGINEERING DIVISION

Giffels & Vallet INC.

DETROIT, MICHIGAN

At Kenton, Ohio—in the world's largest, most modern trailer axle plant—a hydraulic press (right) exerts a 50-ton pressure near the end of every TDA Trailer Axle, bends the tube next to the seams to *insure* strong welds, no weak spots, and complete absence of flaws.

WE BEND TRAILER AXLES

...to insure that all welded super-strong!

Another example of TDA hidden quality—typical of the ends to which we go for greater highway safety—proof in advance that TDA Trailer Axles can take it!

Double trouble! Yes, TDA Trailer Axles are torture-tested at *both* the Kenton, Ohio plant—and the famous Timken-Detroit indoor proving ground in Detroit!

The Detroit "Torture Chamber" is a multi-thousand-acre proving ground condensed into one room. Here, our engineers can subject stock axles and gearing *indoors* to any outdoor operating condition. Put over 50 years' experience gained in building axles for trucks, buses, trailers, farm machinery to work for you.

Result? Far greater highway safety, longer axle life, reduced maintenance, repairs and downtime; lowered operating costs. *No wonder Timken-Detroit Axles are the choice of leading manufacturers and operators.*

For your own protection and safety specify Genuine TDA Equipment Parts!

Take no chances with substitute replacement parts. For longer axle life—for greater operating safety—insist upon genuine Timken-Detroit axle and brake parts, identical to your axles' original equipment.

For a dependable factory-type job, to cut labor and adjustment costs ... *order* your replacement parts by TDA number from your trailer manufacturer.

TDA...the *Lightest* trailer axle on the market...and the strongest!

Proved far stronger, more rugged and safer in all-out "Torture Chamber" tests, TDA Trailer Axles are also many pounds lighter than any competing axles on the market today. Weight saving is possible through the use of TDA lightweight, pressed steel brake shoes, up to 50% lighter, and stronger, too.

Other hidden quality features that increase TDA life and performance are forged alloy steel spindles, cam roller mountings in Nylon bushings, machined cam head, cleaner cut splines and self-aligning camshaft support brackets. Good reasons leading manufacturers and operators specify TDA.

Heat and stress relief treatment for greater strength!

Note the greater extent and depth of heat treatment given this TDA Cam and Seamless Tube. Tube is heat-treated for the *full length*. And, the camshaft is *completely* heat-treated; not just the head. An important ingredient of TDA superiority.

A stress relief treatment is given *every* tube to relieve any stresses created during machining and welding.

TDA Spindles forged of alloy steel have higher rockwell hardness than any other axle spindle on the market.

WITH 50-TON PRESSURE

seams are

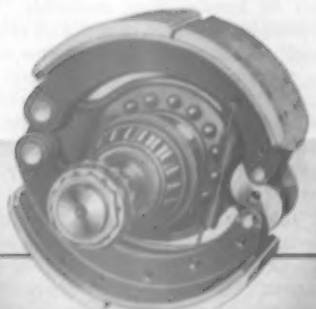
TIMKEN Detroit AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted TDA Standard

TRADE MARK REGISTERED

MEMBER TRUCK-TRAILER MANUFACTURERS ASSN. TTMA



ONLY TDA BRAKES give all these tested advantages!

- Brake shoes made of steel save up to 40 pounds per axle . . . give strong braking action with no distortion.
- Patented liner shape—thickest where wear is greatest.
- Liners riveted on—no chance of movement on shoe.
- Liners circle-ground to cover all efficient braking area of shoe.
- Rustproofed anchor pins locked in. Ends of pin sealed against foreign matter.
- First with self-aligning camshaft housings.
- Cam rollers heat-treated to roll smoother, wear longer.
- First with all-Nylon camshaft bushings.
- Compare similar products part for part and prove to yourself that TDA brakes incorporate the finest quality materials, skilled workmanship and advanced design.

INDUSTRIAL Minerals Given Prominent Place by A.I.M.M.E.

• Annual meeting of American Institute of Mining and Metallurgical Engineers held in Chicago, February 14 to 17 considers many new mineral developments

THE INCREASING ECONOMIC IMPORTANCE of both natural and artificial aggregates was emphasized by speakers before the annual meeting of the American Institute of Mining and Metallurgical Engineers in Chicago, Februray 14 to 17. Water was called "the most important of all industrial minerals," and the urgency of conserving water resources was stressed. Discussions of uranium developments and nuclear metallurgy had prominent places on the agenda. More than 600 engineers, geologists and research scientists participated in the programs either as speakers or chairmen. All sessions were held in the Conrad Hilton Hotel.

Cement, Lime and Gypsum

Preparation of a mixture of marl and limestone for cement manufacture, recovery of lime by the sulphate pulp industry, blast-induced vibrations, a new dead-burned dolomite plant and large-scale handling of materials in quarry operations were discussed by five speakers at the Cement, Lime and Gypsum session of the Industrial Minerals Division.

J. C. Holm, chief engineer, Marquette Cement Manufacturing Co., Chicago, Ill., discussed raw materials at the Brandon, Miss., plant of his company and the specially designed roll crusher and counter-current wash mill to handle these materials. The deposit is a mixture of soft and plastic marl and hard limestone. The marl is extremely sticky and difficult to handle. A primary crusher consisting of a single roll with movable breaker plate, having links with teeth engaging between the teeth of the roll, is proving effective in tipping slabs on end to enter the crushing chamber and in overcoming the stickiness problem inherent in the fine marl. The counter-current wash mill was designed to separate crushed limestone from the washable fraction with the use of minimum water. The mill is mounted on slide-shoe bearings. A minus ½-in. crushed limestone and a minus 20-mesh marl slurry are produced, to be recombined into a tube mill to produce kiln feed slurry. Processing of these materials and the entire mill were discussed in the August issue of ROCK PRODUCTS, 1952, p. 116.

A paper prepared by W. H. Tock of Allis-Chalmers Manufacturing Co. and read by E. C. Mertz of the same company discussed methods used by the sulphate pulp industry in calcining lime sludge through rotary kilns. There are about 100 rotary lime recovery kilns used for the purpose, ranging up to 300 ft. in length. Most of them have heat recuperating chain systems and drum filters or centrifuges to reduce the moisture content. Cake is fed into the kiln by screw conveyor. Discussion developed that pellets less than ½-in. diameter are formed in the kilns. Little dust is formed and the pellets have reasonable strength.

The paper on "Human Response to Industrial Blasting Vibrations," by Jules E. Jenkins, Vibration Measurement Engineers, Chicago, Ill., was of importance to all industries using blasting because of the wide discrepancies between reported vibration intensities based upon human evaluations and the actual intensity as determined by instrument. Responses by human beings to vibrations are responsible for much misunderstanding and considerable criticism of plant operations. The average person can feel vibrations that are less than 100th or 1000th part of the magnitude necessary to damage structures.

The Thornton, Ill., plant of Marblehead Lime Co., Chicago, Ill., has two 9-ft. 6-in. x 250-ft. rotary kilns for production of dead-burned dolomite. Among the more interesting features of this plant, as discussed by L. H. Niems, are low cost material handling, the use of scoop feeders, eddy current coupling kiln drives and direct-contact, counter-flow coolers designed by the author. The kiln drive has infinite speed range using an alternating current motor. The contact cooler is so designed with air locks that nearly all the preheated air is recovered for combustion in the kiln.

Operation of large-capacity excavating and earthmoving equipment, particularly in the handling of heavy overburden, was discussed by John B. Pitts, Jr., of National Gypsum Co., Dodge City, Iowa.

New Industrial Mineral

The recovery and use of staurolite, a new industrial mineral, in the making of portland cement, was described before the Industrial Minerals Division, Monday morning, February 14. The speaker was Charles H. Evans of the engineering staff of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. "The development of an industrial use for staurolite came about as a result of the mining operation for titanium minerals in northern Florida," Mr. Evans said. "In separating the titanium minerals, it was found that the staurolite occurred to a substantial degree and could also be separated.

"The staurolite concentrate is recovered as a by-product in the titanium mineral mining operation of the du Pont company near Starke, Fla. The plant is operated by the Humphreys Gold Corp. The recovery of staurolite started in June, 1952. The staurolite concentrate is now being used by the Lehigh Portland Cement Co., at their plant in Bunnell, Fla." (see ROCK PRODUCTS, August 1953, page 130)

A colored motion picture on "Mining and Processing Bentonite in the Black Hills, South Dakota" was presented by Arthur G. Clem, American Colloid Co., Chicago, at the first day's session. The picture showed mining and processing operations.

Other papers delivered at this session were: "The Synthesis and Properties of Large Single Crystals of $SrTiO_3$," by Leon Merker, resident chemist Titanium Division, National Lead Co., South Amboy, N. J.; "Ceramic Raw Materials from Hydrothermally Altered Rocks," by Oliver D. Bowen, Jr. and Melvin G. Stinson, California Division of Mines, San Francisco, and "Diaspore Flint and Plastic Clay Reserves of Missouri," by F. G. Mertens, Laclede-Christy Co., St. Louis.

Mr. Merker used colored slides to show the production of large single

(Continued on page 153)

HOW TO BUY RUBBER HOSE

FOR LONG LIFE IN ROUGH SERVICE

. . . and get "More Use per Dollar"

Look for a hose construction that is easy to handle, yet strong enough to stand up under tough operating conditions.

It is not necessary for hose to be thick and stiff and heavy. It can be light in weight and still withstand hard use on the job. The lighter the weight, the easier the hose is to handle . . . the better men will like to work with it with less fatigue. Be sure, too, that the hose you buy is the most flexible for the type or diameter you need. If it coils and uncoils easily it is not only easier to handle, there is less internal stress . . . and no kinking, breaking or separation of cover, tube or plies.

If the hose does not kink, it will last longer and you'll get full flow at all times . . . even though it is dragged over rough terrain.

Specify by name the hose construction that combines light weight, flexibility and non-kinking characteristics with maximum safety . . . specify Raybestos-Manhattan Homoflex Hose.

HOMOFLEX HOSE

This is an exclusive R/M construction made in types for handling air, water, gases and other general uses. It has a homogeneous, inseparable tube-to-cover bond. It's as flexible as a rope, light and easy to handle, yet strong enough for the toughest jobs. It maintains uniform inside and outside diameters for easy coupling. . . . Homoflex Hose reduces hose costs by increasing hose life . . . and it's only one of many types an R/M representative can help you select for both general and special purposes. Let him show you why R/M Hose lasts much longer . . . gives you "More Use per Dollar".

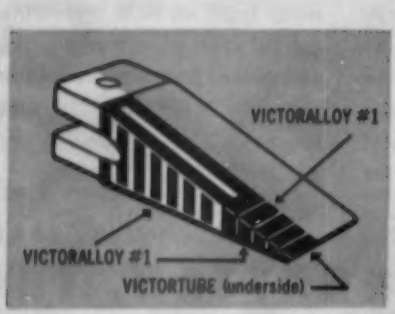
RM-507

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Bowling Balls

USE VICTOR HARDFACING



Buckets . . . Apply VICTORALLOY #1 to top and bottom of bucket lips in overlapping beads. Protect other parts or areas showing wear with stringer beads of VICTORALLOY #1. Use 3/16" coated VICTORALLOY #1 at 170 to 190 amperes, a.c. or d.c., or ¼" at 200 to 225 amperes. If wear is unusually severe, substitute VICTORITE on bucket lips; use 3/16" coated at 120 to 150 amperes, a.c. or reverse-polarity d.c.

Teeth . . . Apply VICTORTUBE to underside from point upward about 2", and VICTORALLOY #1 to upper side of tooth same distance. Use stringer beads of VICTORALLOY #1 on balance of upper and lower surfaces, and on edges. Use 3/16" coated VICTORTUBE at 130 to 160 amperes, a.c. or reverse-polarity d.c., and 3/16" coated VICTORALLOY at 170 to 190 amperes, a.c. or d.c.

Why guess? . . . Select the right alloy from VICTOR's complete hardfacing line, made for both gas and manual or automatic arc application. New VICTOR illustrated hardfacing manual tells which alloys to use, how to apply. Ask your VICTOR dealer or write us today for your free copy.

VICTOR
for hardfacing

VICTOR EQUIPMENT COMPANY
ALLOY ROD & METAL DIVISION
Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

19-H

Profitable dealerships open; inquire now!

11440 So. Alameda St. • Los Angeles 59

crystals of strontium titanate which he said are hard to distinguish from diamonds.

The paper by Mr. Bowen and Mr. Stinson was read by Olaf P. Jenkins, co-chairman of the session with W. F. Dietrich. It described large deposits of volcanic rocks in California, similar to the chinastone deposits in Japan from which highgrade chinaware is made.

Mineral Aggregates Big Market

Seven papers on mineral aggregates were presented. J. E. Lamar, Illinois Geological Survey was chairman, with J. H. Melvin, State Geologist of Ohio as associate chairman.

In a paper on "Sand and Gravel Aggregates of Wisconsin," George F. Hanson, Wisconsin State Geologist, Madison, said that production of sand and gravel aggregates is an important part of the mineral economy of Wisconsin. Of the 1952 production of more than 22½ million tons valued at over 15 million dollars, he said 79 percent was used for paving. The State, Mr. Hanson said, encourages use of local materials for highway construction. Geological field parties survey routes of proposed highway construction to locate source of aggregates.

Chairman Lamar read a paper on "Sand and Gravel Aggregates of Illinois." He said resources are believed to be adequate for a long continuation of the industry at its present level. Mr. Lamar described the industry in Illinois as largely concentrated in the North half of the state in outwash-plain or valley train deposits. The industry consists of plants of a diversity of sizes, he said, including large permanent operations of both dry and wet pit types as well as many smaller operations supplying local or temporary demands.

Indiana Gravels

Duncan J. McGregor, Indiana Geological Survey presented a paper on "Size Distribution and Lithologies of Indiana Gravels." This included a report of sieve analyses on sand and gravel samples from 90 selected localities. Sand and gravel have been recovered from 3084 pits in Indiana of which 653 are now active or active on demand. All are glacial material.

Interpretation of the data obtained from the Indiana studies, Mr. McGregor said indicate:

(1) Gravels consist predominantly of sedimentary rocks.

(2) Moraine, kames and esker deposits are apt to be more variable in composition than valley trains or outwash plain deposits.

(3) Sandstone occurs in larger amounts in moraine and outwash plain deposits than in kames, eskers, and valley train deposits.

(4) Deleterious materials increase in the smaller sieve sizes and such materials also seem to increase south of the Wisconsin glacial boundary.

(5) Igneous, metamorphic rocks are more abundant in the larger sieve sizes.

Most commercial gravels in Indiana come from valley train and outwash plain deposits.

At the head table, left to right: E. H. Robie, L. F. Reinartz; D. Lilienthal, speaker; R. C. Stephenson, chairman, Industrial Minerals Division, 1954-1955; and R. Grogan, chairman, program committee, of the Division

Sees More Uses For Slag

Present uses of blast furnace slag are likely to continue and new applications will be added, in the opinion of E. W. Bauman of the National Slag Association. His paper was entitled, "The Blast Furnace Slag Industry of the United States."

Mr. Bauman showed that since 1900 when a negligible quantity of slag was processed for commercial use, slag has become an important mineral aggregate. It is utilized in several forms, air-cooled, granulated and expanded. Mr. Bauman said that of more than 37 million tons of slag produced in 1953, more than 30½ million tons were processed.

Problems of Stone Industry

The stone industry produces 71 percent of the dollar sales of all industrial minerals. Crushed stone alone produced more than 300 million tons in the United States during 1953. This yielded dollar sales of about $430,000,000.

These were some of the statistics quoted by Nelson Severinghaus, vice-president and general manager of Consolidated Quarries Corp. in his paper entitled, "Production Problems of the Stone Industry and Needed Research."

Mr. Severinghaus discussed in some detail problems relating to drilling for placing of explosives, the methods of which he said, are as varied as the kinds of rock involved. He said the complex problem of choice of size, spacing and burden of holes for optimum results, "probably affects subsequent capacity and costs more than any other operating facility. We break rock down onto the quarry floor for a direct cost of 10¢ to 25¢ per ton. After that we spend four to six times that amount before stone is finally loaded out for shipment. A 100 percent increase in the cost of primary drilling and blasting might well be justified if we could increase plant capacity by one third with better breakage. It is easy to be 'penny wise and pound foolish' when considering drilling."

The matter of replacement and conditioning of bits represent a major portion of drilling costs, said Mr. Severinghaus. The question of proper footage between bit reconditioning needs study for each separate location. Using 4-in. tungsten bits, his company has found it advantageous to grind after each 20-ft. of drilling. By doing this, "We obtain an average of ten regrinds or 200-ft. per original new bit."

Choice of blasting agents and methods of detonation, he said, present another puzzling problem. In quarry loading and haulage, the big problems are those of scheduling and maintenance. He emphasized the wisdom of having some excess haulage capacity to offset temporary breakdowns. The importance of having well organized repair crews and careful scheduling of repair work was stressed. He said cleanliness and good housekeeping are especially important.

"The last and most important oper-

ating problem I will mention," said Mr. Severinghaus, "is that universal one of relations with the men who operate our plants. Quarries are not generally thought of as particularly desirable places to work. They are alternately hot and cold, dusty and wet. Seasons and weather often lead to unsteady employment. Housing and living conditions are seldom as good as they might be. Even wages and salaries often leave much to be desired.

"If we are to attract and hold competent personnel, we will have to give more serious thought to working and living conditions. We are operating a very great industry which contributes a tremendous share toward the advancement and building of our country. The least we can do is to generate enthusiasm in the task with praise and reward where work is well done."

The speaker believes that the stone industry should get at the job of research and indicated the directions which research efforts should be applied.

One important field of research, Mr. Severinghaus said, is in drilling and blasting because of the cost of these operations which he mentioned earlier. He suggested that drill and explosives manufacturers should get together with stone producers and set up a definite research program.

"The need for development of lighter and smaller stone industry equipment which is easy to transport and erect has long been apparent," the speaker continued. "Obviously these machines must be reliable producers which can operate under a wide variety of conditions. As transportation costs increase and new points of use of stone products appear over the country, new deposits must be utilized, many of them for a short time only. The burden of research into proper equipment to handle this new development will fall largely upon the manufacturers. Practical application of the new machinery to changing needs will require research by producers."

The speaker also suggested that research into methods of handling stone in stockpiles might point the way to reduction of unwanted fines.

"Probably the most frequent cause of engineer rejection of aggregates is improper sizing," Mr. Severinghaus declared. "Often the material would meet size specifications when it is finally screened, but serious size segregation takes place in handling through stocks and loading. An investigation of possible economical methods of reducing this segregation would improve our product as it reaches the customer.

"Sizing itself could often be improved. Size shipped is sometimes a compromise between what the customer actually wants and what we think we can produce economically in our plants. Research into methods of modifying size distribution without materially increasing plant costs could sometimes produce a better product.

"I have mentioned the large amounts of so-called waste products which often accumulate from stone operations. Research should find some marketable use for these. In our own case, development of stone sand for use as fine aggregate has partly solved this problem. Now we are wasting only minus 100 mesh instead of minus ⅛-in. Additives to overcome the natural harshness of broken stone sand need research to broaden the acceptance of this product.

"With all mining and grinding costs already charged against our main products, it would seem that research should find some profitable use for the fines we continue to waste. Our first step in that direction is to gain a thorough knowledge of the mineralogical, physical and chemical properties of this material, then try to match these properties with possible uses, both new and old. Some further treatment will generally be indicated and we must research into methods and costs of effecting such treatment."

Ceramic Railroad Ballast

Manufacture of ceramic aggregates made from clay and shale and their use as railroad ballast was discussed by Norman Plummer of the Kansas Geological Survey. His paper was entitled, "The Manufacture of Ceramic Railroad Ballast and Constructional Aggregates from Kansas Clays and Silts."

Mr. Plummer pointed out that the State of Kansas is chiefly dependent on crushed limestone for such uses as railroad ballast, concrete aggregate and road metal; that relatively hard limestone is plentiful in the eastern half of the state but only soft limestone occurs in the western half.

A series of tests conducted in the ceramics laboratory of the State Geological Survey has demonstrated, Mr. Plummer said, that a durable material suitable for railroad ballast, concrete aggregate and allied uses can be manufactured with standard industrial equipment from the cheap and abundant clay and silt resources of Kansas. Although the experimental work was done in a 30-ft. rotary kiln, Mr. Plummer said that from a standpoint of economy and quality the kiln best suited to make ceramic slag would be about 250 ft. long with an inside diameter of 12 ft. The speaker said that it is estimated that the cost of producing ceramic slag on a large scale in a rotary kiln will range from $1.15 to $2.25 per ton.

D. M. McFarland, Atlas Powder Co., presented a paper illustrated with slide pictures, on "Developments in the Field of Explosives as Related to the Production of Mineral Aggregates." He showed that there have been rapid changes in drilling equipment in recent years. There have also been many improvements in blasting wires, caps, fuses, and detonators.

New Uses for Fuller's Earth

New uses are absorbing more than half of the American production of Fuller's earth. This was brought out in a paper by James L. Calver of the Florida Geological Survey. His paper was entitled, "Fuller's Earth Industry in the Florida-Georgia District."

For half a century until 1942, nearly all of the Fuller's earth produced was used in filtering and decoloring mineral and vegetable oils. Since 1942, Mr. Calver showed that new uses for these clays include rotary drilling muds, absorbents for oily floors, carriers for insecticides and fungicides, catalysts and fillers. These new uses consumed 60 percent of the 1952 production.

The growth of the paper industry has brought about changed requirements for filler and coating clays. Important specifications for present-day paper clays were discussed by C. G. Albert of the Minerals & Chemical Corporation of America, in his paper, "The Requirements of Modern Paper Clays."

L. R. Blair of the Johns-Manville Co., discussed the properties which a substance must have to qualify as good pigment material. His paper was on "Pigments—A General Survey With Special Reference to Titania."

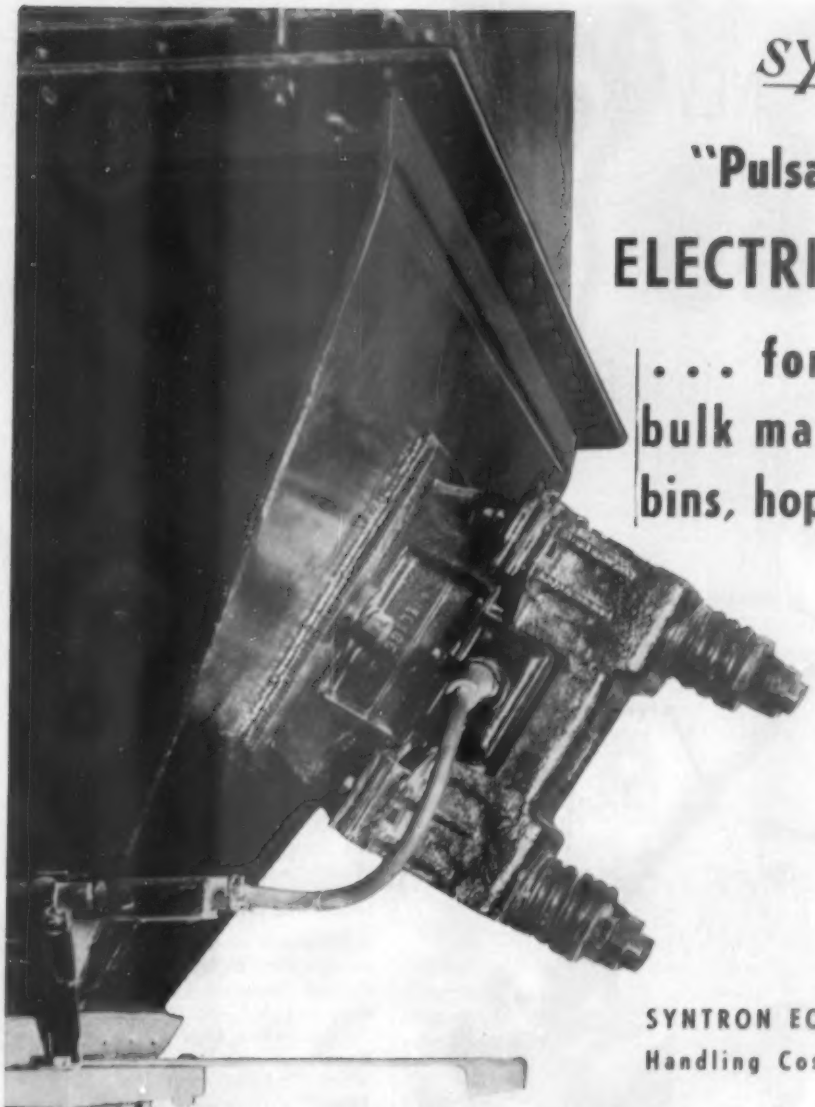
In a paper on "A New Use for Barytes," Walter F. Winters, of Rubarite Inc., discussed the use and manufacture of an asphalt rubberizer consisting of barytes and latex rubber.

"Ball Clay Mining in the United States," was discussed in considerable detail by Richard Bell of Bell Clay Mining Co.

"Quality Control of Wollastonite" was the title of a paper by C. H. Pratt of the Cabot Carbon Co., who described quality control methods developed for what is referred to as a unique addition to the field of finely ground, non-metallic minerals, commercially available for use in paint, plastic, ceramic and other applications.

David Swan, of the Metals Research Laboratories, Electro Metallurgical Co., delivered a paper on "Unsolved

(Continued on page 156)



SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS

. . . for a free flow of bulk materials through bins, hoppers and chutes

3600 controllable, electromagnetic vibrations per minute prevent arching or plugging of the most stubborn bulk materials. Have no mechanical wearing parts that require maintenance. Compact—easy to install. Eliminate equipment damage from rodding, poking or sledging. In models and sizes for any bulk handling installation.

SYNTRON EQUIPMENT Reduces Handling Costs — Speeds Production

VIBRATING SCREENS

Heavy tonnage sizing and scalping. Replaceable screen surface, electromagnetic, finger-tip control.

VIBRATING GRIZZLIES

High speed, controllable feeding and scalping in one operation. Clean, low cost separation of materials.

2000 powerful blows per minute with automatic rotation of drill bit. Drills holes up to 2" in dia.

GASOLINE HAMMER Rock Drills

100% Self-Contained

TEST SIEVE SHAKERS

For quick, accurate sieve analysis. Positive control of time and speed for uniform testing.

WEIGH FEEDERS

For controlled, accurate feeding by weight. Load variations corrected automatically. Low cost, continuous operation. Efficient weigh feeding practically any material in bulk.

WRITE TODAY FOR COMPLETE CATALOGUE DATA — FREE

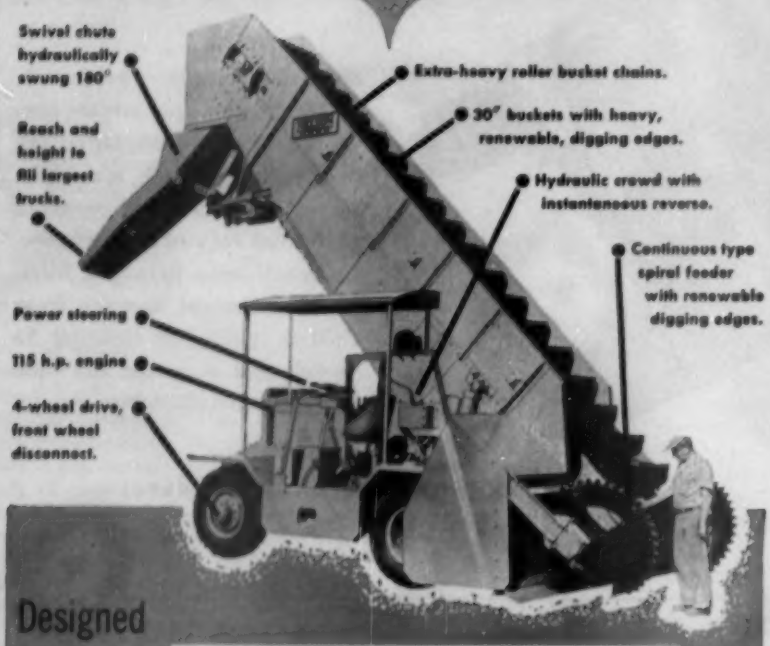
SYNTRON COMPANY

450 Lexington Avenue — Homer City, Penna.

Introducing the NEW Nelson

B-68

Heaviest • Toughest • Most Powerful Loader Ever Built!


Swivel chute hydraulically swung 180°
Reach and height to fill largest trucks.
Extra-heavy roller bucket chains.
30" buckets with heavy, renewable, digging edges.
Hydraulic crowd with instantaneous reverse.
Continuous type spiral feeder with renewable digging edges.
Power steering
115 h.p. engine
4-wheel drive, front wheel disconnect.

Designed for HIGH SPEED stone, sand and gravel producers

• All of these features packed into a big, rugged, 38,000 lb. loader permit handling of tremendous volumes of material at lowest cost per yard . . . Practical if you load only 1,000 tons per day—yet can easily handle *up to three times that amount!*

Will pour *10 tons per minute* into the largest trucks without 'jockeying' under chute, distributes it evenly from front to rear. One man controls entire operation . . . Moves under own power at 20 m.p.h. speed!

MATERIAL FLOWS CONTINUOUSLY from stockpile to truck—the fast, easy, economical way!

NELSON

N. P. NELSON IRON WORKS, INC.

CLIFTON, NEW JERSEY

Mining Engineers Meeting

(Continued from page 154)

Economic Problems in Utilization of Minerals," before the Minerals Economics Division. He said that there is an urgent need for more trained technologists, new research facilities and new sources of capital.

Richard J. Lund of Batelle Memorial Institute gave a paper on "Research —Challenge to the Mineral Industry." He said the problem of supplying markets for present production capacities is less acute for non-metallic minerals because of the activity of the construction industry. Technology favors some materials, he said. He showed that per capita consumption of cement had tripled each recent decade and doubled in the case of sand and gravel. Research, he pointed out, is directed toward finding ways to make a material that will better serve a useful purpose. The mineral industry, he said, can benefit greatly from expanded research. New uses are now being sought for fluorspar and silica sand.

Industrial minerals are increasingly important in the Pacific Northwest, although still dominated by production of concrete aggregate materials, a session of the Geology Subdivision on Mineral Resources was told. The speaker was Ralph A. Watson, geologist of the Great Northern Railway. His subject was "Latent Mineral Wealth in the Pacific Northwest."

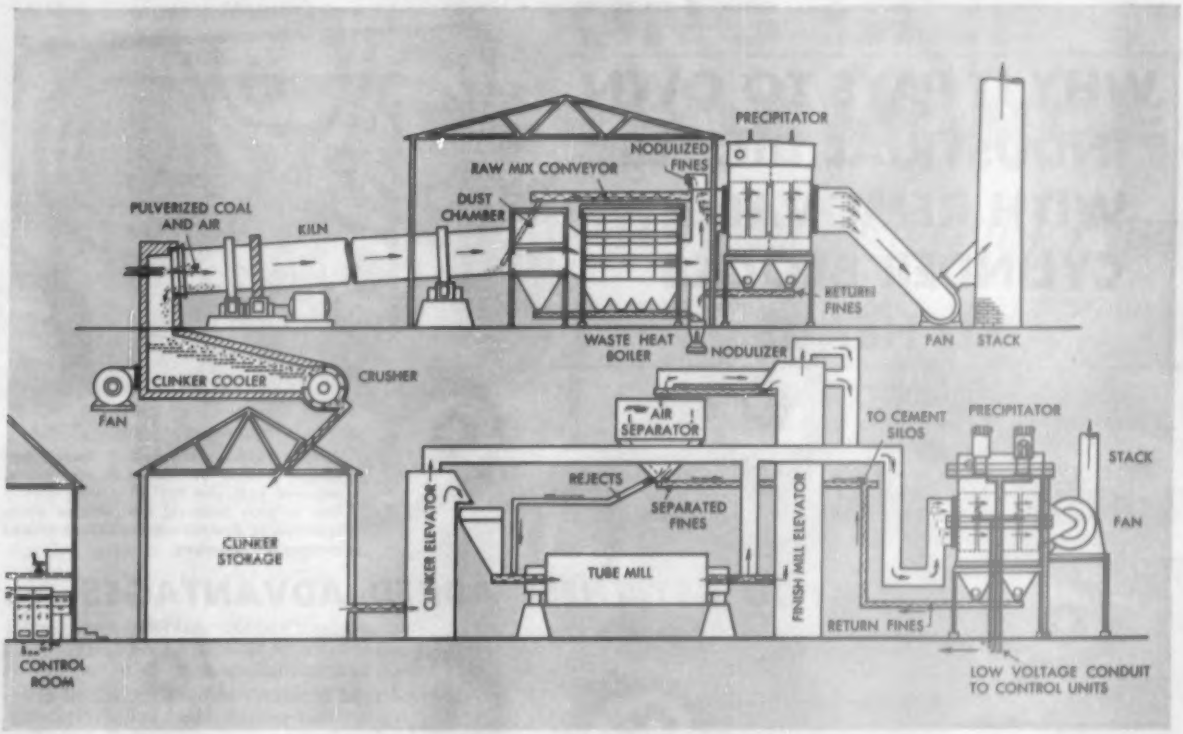
Industrial Waters

Programs on Industrial Waters were given under the sponsorship of the Industrial Minerals Division. One session included the following papers: "Groundwater Geology in Industrial Expansion and Decentralization," by John W. Foster and John C. Frye, Illinois Geological Survey; "Water Quality and Industrial Uses," by John E. Tarman, consulting division, W. H. & L. D. Betz, Philadelphia; "Problems of the Mineral Industry Arising from Water Resources and Flood Control Development," by Leo H. Dupuy, U. S. Bureau of Mines, and "Evaluation of Rain-Making and Weather Modification Techniques," by H. T. Orville, Bendix Aviation Corp., Baltimore, Md.

"Water is the most important of all industrial minerals," said chairman R. M. Foose.

Water as a weapon in the cold war was a basic theme of the main address at the Industrial Minerals Division luncheon on Wednesday. The guest speaker was David E. Lilienthal, chairman of the executive committee, Minerals and Chemicals Corporation of America, former chairman of the Atomic Energy Commission.

(Continued on page 159)



How dust collecting problems are handled in the modern cement plant

The "why" of the Cottrell precipitator is well known to cement plant personnel—its use in nuisance abatement and cement dust salvage is well established. These diagrams explain the "how" of the Cottrell, including its familiar application to kiln gas and, more recently, its use in the ventilating system of the finishing mill.

Kiln Gas

The upper half of the drawing shows a Cottrell for cleaning kiln gases. They are first passed through a dust chamber to the waste heat boiler and from there to the electrical precipitator, where the dust is removed. Salvaged dust is returned by conveyor to the process. The cleaned gas is discharged to the atmosphere through an induced draft fan and the stack. (Wet process kilns may also be fitted with Cottrells).

And In The Finish Mill

Dust from the grinding mills has always been a major problem. The lower half of the diagram shows the recent application of the Cottrell for cleaning finish mill ventilating system gases. Cement dust is collected from the ventilating system serving the separators, conveyors and elevators. As before, recovered dust is returned to the process.

Separating Small From Large Particles

When large particles of low alkali content must be separated from very small particles of high alkali content, an integrated mechanical-electrical precipitator will do the job effectively. The mechanical element handles large particles, and the electrical element collects the smaller particles that escape it.

Rapping Puffs Eliminated

With Research-Cottrell's electronically controlled Magnetic Impulse Rappers, there is no need for rapping shutdown periods or dampers. Automatically controlled and operated, the MI Rappers continuously rap the electrodes throughout precipitator operation, thus avoiding dust re-entrainment in the gas stream and assuring optimum precipitator performance at all times.

Many Design Advances

The MI Rapper is one example of many improvements that have taken place in the design of precipitators and their associated electrical equipment. Forty years of experience have provided Research-Cottrell with a rich store of engineering skill—it is this skill that has evolved the modern Cottrell precipitator, embodying a design based on knowledge gained through more than 2000 precipitators in many different fields. Fourteen of these have been installed or are under construction for cement plants. All of these precipitators were custom-engineered to individual specifications.

For a more complete description of the Cottrell precipitator, write to Research-Cottrell for Bulletin GB.

RESEARCH-COTTRELL, INC.

A Wholly Owned Subsidiary Of Research Corporation

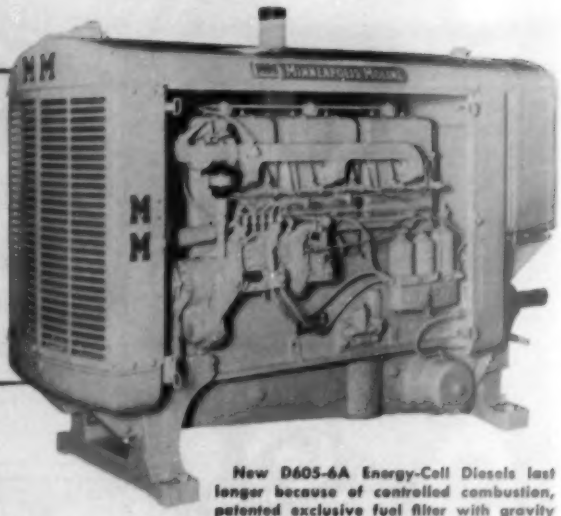
MAIN OFFICE AND PLANT: BOUND BROOK, N. J.

405 Lexington Ave., New York 17, N. Y. Grant Building, Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

WHY IT PAYS TO OWN INDUSTRIAL DIESELS WITH REMOVABLE CYLINDER BLOCKS AND HEADS

New MM diesels were developed with *energy-cells* to make them last longer, do more and go farther with less down-time and maintenance.

To provide owners with lower cost maintenance when necessary MM diesels are the most advanced and soundly engineered because the cylinder blocks are cast in pairs separate from the crankcase.

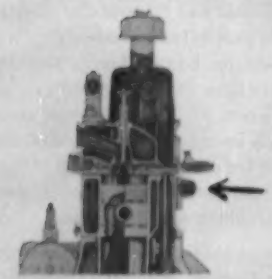


New D605-6A Energy-Cell Diesels last longer because of controlled combustion, patented exclusive fuel filter with gravity and by-pass features, self-cleaning pintle type nozzle, directed cooling of area around combustion chambers.

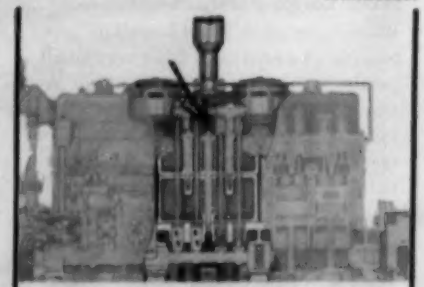
YOU GET THESE ADDED ADVANTAGES . . .

1. Ease of maintenance and low cost emergency service because paired cylinder blocks, pistons, and rods can be removed as a unit by one man.
2. Prolonged time between overhauls by use of close-grain cast iron that provides best cylinder lubrication for reduced wear.
3. Less service due to minimum distortion as MM cylinder heads, cylinder blocks and crankcase are virtually strapped together by full-length steel studs anchored in the main bearing bulkheads. (Transmits combustion pressure to heavy crankcase that has extra depth below center line of crankshaft.)
4. Efficient operation obtained by uniform cylinder expansion . . . the result of controlled cooling and long oil-cooled cylinder wall skirts below ring travel area.
5. "New engine" performance at extremely nominal cost can be obtained right in the field without special tools using factory matched cylinder blocks, pistons, pins, and rings. (Blocks are dowelled to crankcase to assure bore is square with crankshaft and pistons are precision fit to bore . . . equivalent to a factory job.)
6. Lower initial cost stems from high production parts by casting cylinder blocks in pairs separate from the crankcase.

D605-6A equipped with Thermo-Clad base pan.



1. Cylinder head and block assembly shows coolant entrance at hottest point first and extra long skirt wall construction.



2. Close-up of how MM cylinder heads and blocks and crankcase are tied into a single rigid unit with long studs.

3. A D283 feature is extra large oil filter enclosed in base pan, floating-screen oil pump intake, and pump located in bottom of base pan.

Optional Thermo-clad water-blanketed base pans for all units also have oil filter included to give more effective filtering.

INDUSTRIAL
MINNEAPOLIS MOLINE
MODERN MACHINERY
DIVISION

MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

Mining Engineers Meeting

(Continued from page 156)

Mr. Lilienthal expressed the opinion that there will be no "shooting War" but that we will be in a state of economic siege in the years ahead. He declared that in the next ten years we should do everything possible to avoid a shortage of water. He pointed out that in ten years from now there will be 30 million more people in the United States and Canada and 60 million more in 20 years but there will be no more water than we have now.

"There is a very great need for more sources of water," he said. "What greater weapon could we have in the cold war of the next ten years?"

Mr. Lilienthal suggested that the time is overdue for what he called "a crash program to develop an economically feasible way to concentrate and remove minerals from sea water and thereby make it useful for irrigation, industrial needs and water supply."

The A.I.M.M.E. annual banquet was held Wednesday night, with Leo F. Reinartz, 1955 president of the Institute as toastmaster. Professional medals and awards were presented. The principal address was delivered by Henry DeWitt Smith, president of the Institute for 1955.

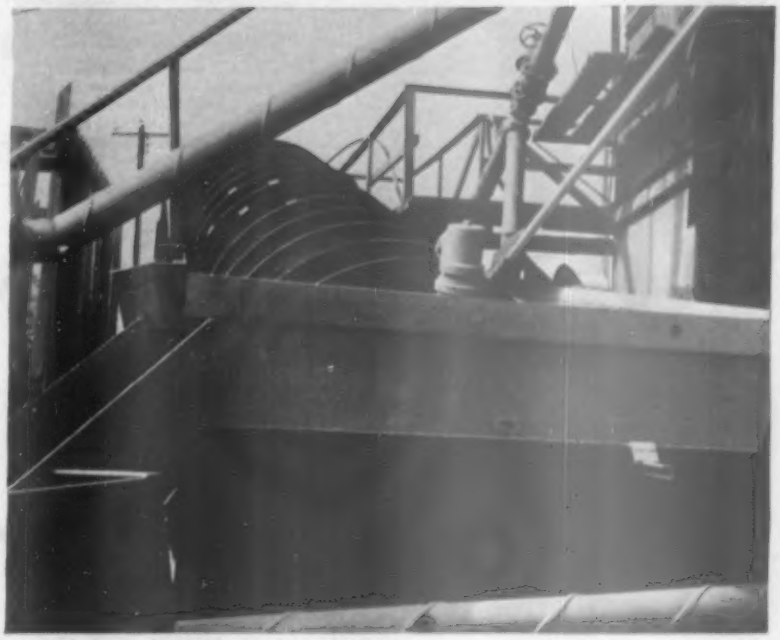
Sands and Abrasives

Two sessions were devoted to papers on special sands and abrasives. Papers were entitled, "Industrial Sands and Abrasives in the Southern Mid-Continent Region," by William E. Ham of the Oklahoma Geological Survey; "Flotation of Del Monte Sand," by William Messner, (deceased) given by Herbert Dux of the Pennsylvania Glass Sand Co.; "Sand Usage in Hydraulic Fracturing Oil-Bearing Formations," by W. E. Hassebrock, Halliburton Oil Well Cementing Co., Duncan, Okla., and "Michigan Bank Sands" by Warren E. Lewis, Great Lakes Foundry Sand Co.

Mr. Ham described silica sands produced in Arkansas, Kansas, Missouri, Oklahoma, and Texas and their wide variety of uses. Five different types of sand produced in Arkansas, he said were used for glass sand, formation fracturing sand, ground silica, abrasives, whetstones, tumbling blocks and silica brick. Sand from six different sources in Kansas, he said, are used for abrasives, quartz-feldspar mixture for making fiber-glass, molding and core sand. Eight Missouri sands he listed as being used for glass and foundry sand, silica-lime brick, grinding, cutting and polishing and fine abrasives. Seven Oklahoma sands were listed as being used for glass sand, foundry sand, sodium silicate, molding sand and fine abrasives. The sand from

KING SIZE PERFORMANCE

with NAYLOR *Lightweight Pipe*



It's no trick to get king-size performance from air and water lines in mining service when you use Naylor large diameter lightweight pipe.

Naylor is the one lightweight pipe built to handle jobs normally requiring heavier wall pipe. That's because of Naylor's exclusive lockseamed, spiralwelded structure which creates a pipe that is recognized for its greater strength and safety.

Its light weight makes Naylor pipe easier to handle and install, particularly with the one-piece Naylor Wedge-Lock Coupling to speed connections. Pipe sizes range from 4 to 30 inches in diameter.

For the complete story on this distinctive combination, write for Bulletins No. 507 and No. 513.

NAYLOR PIPE

NAYLOR PIPE COMPANY

1237 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

Connected to a 4-station St. Regis packer, this 12-foot Sly Dust Filter exhausts 9,000 cfm.

LONE STAR saves with SLY DUST CONTROL

Dust hood at 4-station St. Regis packer.

Dust hood at one of the ball mills.

Dust hood leading from 24" screw conveyor.

Cleanliness pays off in this Lone Star Cement Corporation plant where Sly Dust Filters give an *all star* performance, 24 hours a day, day after day.

These filters collect dust at critical points — save cement — effect operating economies — assure a cleaner plant. For Sly Dust Filters are designed and built with an abundance of cloth for greater filtering capacity and a 100% filtering job.

Top notch performance with *"no appreciable maintenance"*— such is the record of Sly in this plant as in thousands of others. Long experience, as pioneers in the field, provides a background for the advanced engineering Sly users receive.

If you have a dust problem, let's talk it over. Ask for Bulletin 98 — full of helpful information on controlling dust, *economically.*

THE W. W. SLY MANUFACTURING CO.

4746 TRAIN AVENUE • CLEVELAND 2, OHIO

New York • Chicago • Philadelphia • Rochester • Birmingham • Cincinnati Buffalo • St. Louis • Minneapolis • Detroit • Denver • Los Angeles • Toronto

PIONEERS AND LEADERS IN INDUSTRIAL DUST CONTROL

various locations in Texas were described as being used for glass sand, sand blast, sodium silicate, fracturing sand, molding sand, filter sand, abrasives and flint grinding pebbles.

Mr. Hassebroek described the use of rounded silica sand grains in hydraulic fracturing treatment of oil wells. The graded sand grains suspended in a viscous fluid prop open fractures created by injection under high pressure. He said Ottawa sand is used more frequently in hydraulic fracturing operations than any other.

The process requires considerable amounts of sand, the speaker said, 15,000-lb. to 50,000-lb. per treatment being common with maximum quantities being as high as 200,000-lb. per treatment in some areas. Several treatments are sometimes performed on one well. The sand is shipped in 100-lb. waterproof bags or in special bulk cars. Mr. Hassebroek's paper was illustrated with colored slides showing equipment in action.

Industrial sand is found in nearly every county in Michigan, Warren D. Lewis said in his paper on "Michigan Bank Sand." There are excellent reserves, he said, except in the very fine sizes. He referred especially to large operations near Saginaw and Bay City. Michigan sands are largely used by both ferrous and non-ferrous foundries. Deposits near Ludington are used in glass making.

Thomas D. Murphy of the U. S. Geological Survey had for his subject "High Purity Silica Resources of Southeastern United States." He defined high-purity silica resources as naturally occurring materials that on analysis yield 95 percent or more of silicon dioxide. Deposits in Virginia, West Virginia, Kentucky, Tennessee, North and South Carolina, Georgia, Alabama, Mississippi and Florida were described.

The speaker expressed the belief that silica raw material resources are adequate to meet any forseeable demand, but the industry shows signs of expansion.

Bonded Sand

Robert J. Maddison of Whitehead Bros. Co., New York, presented a paper on "Eastern Bonded Sands," the sands which made the American foundry industry independent of bonded molding sands imported from Europe. His paper referred specifically to what are known as naturally bonded sands—the sands that have been prepared by nature, dug, graded and sometimes blended to meet the requirements of the foundry industry. The sands he discussed are known as the South Jersey and Albany molding sands.

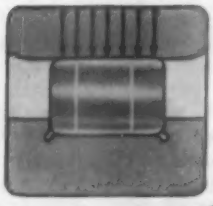
ROLLWAY

Tru-Rol

ROLLER BEARINGS

...up-to-the minute design... plus economy

All Tru-Rol Bearings Now Have



CROWNED ROLLERS . . .

Crowned Roller under full load — stress uniformly distributed.

• Proved in performance . . . proved for economy . . . unsurpassed for versatility . . . the Tru-Rol Bearing incorporates the design know-how accumulated through Rollway's many years of experience with all types of cylindrical roller bearings. Tru-Rol's features result in adaptability for any application requiring just the right balance between precision and economy.

• Designed for Versatility: Tru-Rol is available in all the inner and outer race combinations demanded by today's design. Crowned cylindrical rollers eliminate end loading—assure a uniform stress pattern along the *full length* of each roller, and prolong bearing life. Tru-Rol versatility offers a choice of stamped steel retainers with *guide lips*, or steel segmented retainers . . . both providing perfect alignment for every roller. These features have been quick to gain favor with engineers, and have led to the selection of Tru-Rol Bearings for a broad variety of applications.

Free! New Catalog . . .

36 pages of Valuable Information—Mail Coupon Today. The Tru-Rol Catalog includes all required data on every size, every type of Tru-Rol Bearings; complete description, ratings, dimensions—plus *extra* copies of the new Quick-Calculating Alignment Chart . . . a *graphic* solution of the *RBEC formula for bearing selection.

*Roller Bearing Engineers' Comm.—Anti-Friction Bearing Mfgs. Assn.

ROLLWAY BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ROLLWAY BEARING CO., INC.
573 Seymour St. • Syracuse 4, N. Y.

Please forward free copy of your new Tru-Rol Catalog with extra Alignment Charts.

Name_____ Title_____

Firm Name_____

Address_____

City_____ Zone____ State_____

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

Here's How . . .

Dump a big dipper full of heavy rock or ore into a Heil Rock Body. Drop the biggest boulder your bucket can hold into it. Give it the roughest shock treatment of a rough industry.

Production rolls merrily along!

As long as the trucks under them move, Heil Shock-Proof Rock Bodies are in your production line, because they're built to stay on the job and out of the shop.

The 2" hardwood cushion sandwiched between body bottom and wearing plate absorbs load shock. Bodies fabricated of ¼" (or heavier) steel plate, rigidly reinforced by box member ribs, assure "no sag" strength and stamina. For cold weather work or handling sticky gumbo, heated floor construction can be supplied.

HEIL HEAVY-DUTY HOISTS

Hoist performance is just as important to keeping up production as shock-proof bodies. Heil Hoists are matched to Heil bodies for always dependable, always economical durability.

Call your Heil distributor for proof of Heil Body and Hoist production in the field.

Always Specify

THE HEIL CO.

DEPT. 7745, 3077 W. MONTANA ST., MILWAUKEE 1, WISCONSIN

Factories: Milwaukee, Wis. — Hillside, N. J.

Heil Sales Offices: New York, Union, N. J., Atlanta, Cleveland, Milwaukee, Chicago, Kansas City, Denver, Dallas, Los Angeles, Seattle. BH-53-R

Liming of Acid Soils

(Continued from page 143)

spring or this fall; in fact, during the winter if the snow isn't too deep. I'm not really worried about losing any of that lime applied on some snow — it will cut its way through and finally bed itself in the soil below. Lime is only slightly water soluble — it depends for its availability on reaction with soil acids. The finer particles will be washed down into the surface two or three inches of soil and will do a lot of good by correcting this surface acidity.

True, some of these fields that are yellowing may be lacking other elements of plant food. There is a certain characteristic yellowing due to a lack of boron but this usually shows up in July and August during dry periods. Then too, some fields definitely lack in phosphate and potash. In fact, alfalfa is a tremendous feeder and we have urged farmers to topdress these old alfalfa fields with mixtures like 0-10-30 or 0-20-20 to which boron has been added. We say give these old alfalfa fields a good square meal of plant food and put them in shape for next year's crop, — and testing the soil will give us a pretty good idea of what the deficiencies may be.

Helps to Retain Phosphorus

Speaking of the benefits of liming, we know that lime not only neutralizes soil acidity but supplies the element calcium and as well, magnesium (if dolomitic limestone). Yes, lime helps to retain phosphorus in a form that is more readily available to growing crops. Certainly it's true that the liming of these acid soils will throw out of solution soluble iron and aluminum compounds and thus prevent these elements from combining with phosphorus to tie it up in less soluble form. In fact, the liming of our acid fields over a period of many years has very definitely loosened up and released phosphorus from these soils. Soil tests made on fields that were limed 6, 8, 10, and 15 years ago and maintained at a pH around 6.5, will invariably show a higher level of available phosphorus than fields that were not limed. In fact, the general tendency and trend is toward more available phosphorus in our soils. We're finding this to be true with the thousands of soil tests that we're making; but true also the potash content is going down. Fields that before they were limed did not respond to treatment with potash now after a period of 10-15-20 years are showing a definite need for extra potash.

I might explain this phosphorus availability thing in a little more de-

(Continued on page 164)

Why this crusher does the work of two

The answer is simple . . . *because it's really two-crushers-in-one.*

As shown in the drawing at the right, large material is first reduced between floating top roll and drive roll. Then, without need for elevator or conveyor, it passes between drive roll and floating horizontal roll.

With this exclusive 2-in-1 action, a 54x24 PIONEER Triple Roll Crusher reduces *7½" rock to 1" in a single run* . . . and at the amazing rate of 100 to 160 tph, depending on material.

This ability to convert larger rock into material of the desired specification makes it possible to open up the primary crusher and thereby increase plant capacity by many tons.

Triple Roll Crushers, manufactured only by PIONEER, come in 3 sizes. Capacity of the big 54x24 ranges up to 640 tph, depending on material and size of product. The smaller 40x22 and 30x18 also offer extra performance . . . pound for pound, hour for hour, dollar for dollar.

OTHER FEATURES

1. Star gear drives outwear chains at least 10 to 1 . . . cut costly down time, maintenance.
2. Less power required per inch of reduction and ton of material . . . 150 H.P. handles biggest model easily.
3. Widest range of adjustment, pound for pound, of any secondary crusher.
4. Lowest initial cost for any given stage of reduction.

SPECIFICATIONS

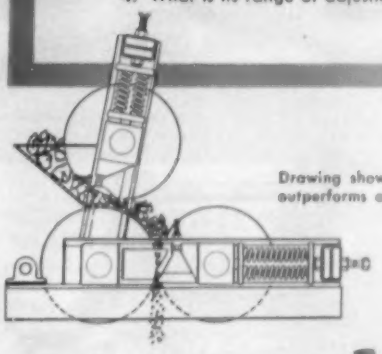
PIONEER Triple Roll Crushers	Model 54x24	Model 40x22	Model 30x18
Max. stage of reduct.	6½"	5"	3½"
Max. size of feed . . .	9"x9"	7"x7"	5"x5"
Capacity (tph)*	32-512	24-287	16-131
Recommended H.P. . .	150	125-150	85-105
Approx. wt. (lbs.). . .	51,300	27,000	14,900

Roll drive: Chrome molybdenum star gears sealed in oil.

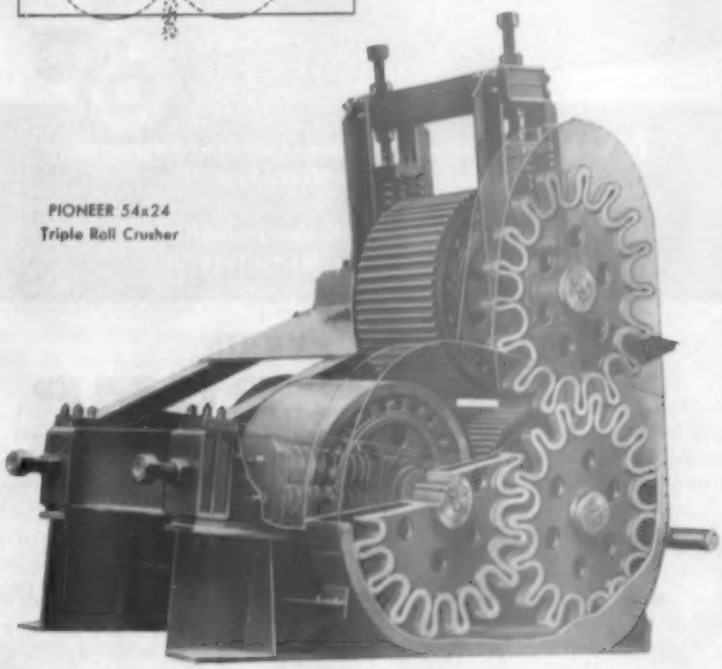
*May vary ± 25% depending on material and size of product.

Ask your crusher salesman these questions

1. How readily can crusher be repaired or maintained?
2. How does it perform in sticky material?
3. What is maximum size rock the crusher can be fed and still produce the desired material?
4. What is its range of adjustment?



Drawing shows why compact Triple Roll Crusher outperforms any other secondary crusher made



PIONEER 54x24
Triple Roll Crusher

For details, write Pioneer Engineering Works, Inc., Minneapolis 13, Minn. (subsidiary of Poor & Company, Chicago) or nearest PIONEER Distributor.

BUY BOTH! HIGHER OUTPUT LOWER UPKEEP

Pioneer *Continuflo* EQUIPMENT

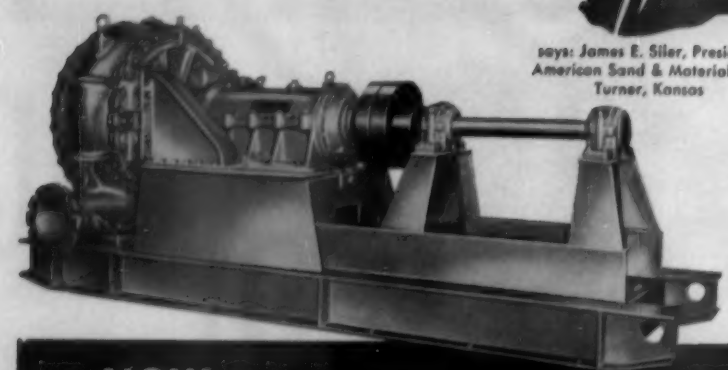
Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.
Subsidiary of Poor & Company • Chicago
Please send information on equipment checked.

☐ GRAVEL PLANTS	☐ WASHING PLANTS	☐ MECHANICAL FEEDERS
☐ ROCK PLANTS	☐ BITUMINOUS PLANTS	☐ VIBRATING SCREENS
☐ JAW CRUSHERS	☐ APRON FEEDERS	☐ BUZZER SCREENS (LIGHT DUTY)
☐ ROLL CRUSHERS	☐ ORE FEEDERS	☐ CONTINUFLO CONVEYORS

Name _____
Company _____
Address _____
City _____ *Zone* ____ *State* _____

"We Ran Our Morris Pump for 25 YEARS... and then Doubled its Load!"

says: James E. Siler, President
American Sand & Material Co.,
Turner, Kansas



NOW... combining the lower speeds and outstanding reliability of the Morris Type "F"

AND the modern hydraulic design, high heads and efficiency of the Morris Type "G"...

THE NEW MORRIS

DREDGE PUMP

Jim Siler's experience is typical of long-time Morris owners. Heavy, rugged, dependable Morris equipment has been the first choice for abrasive-handling pumps for nearly 90 years.

Morris pumps are engineered to give uninterrupted, year-in-year-out handling of solids at any consistency that is fluid. Some important features of the new Morris GA and GAF Dredge Pumps:

Oversize Shaft and Bearings — easily withstand vibration and shock loads for longer on-the-line service and lower maintenance costs.

Heavy Volute Casing — thicker at points of greater wear, plus a choice of various alloys to increase internal life.

Economical Impeller Design — insures even wear. An enlarged suction shroud maintains effective pressure balancing and high efficiency.

Write today for a complete catalog, or better still, let our engineers help you select the right pump size for your particular needs. No charge or obligation.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

tail. It's true, the acid clay particles fix and hang onto soil phosphorus very tenaciously, but in the liming of the soil, calcium combines with these acid compounds and while it's true, phosphorus in the form of superphosphate may revert to di-calcium or tri-calcium phosphate, yet it is infinitely more available in these forms than in the form of the iron or aluminum phosphates. What about the effect of liming on the availability of phosphorous applied in the form of rock phosphate? Liming of a soil which neutralizes soil acids slows down the rate at which phosphorus in the form of rock phosphate becomes available, but we should maintain our soils at a pH of 6.5 or higher.

Liming Pastures Pays

Let's start liming our acid pastures, too. Lime every acre of acid pasture land. It will result in the more abundant growth of clovers. Even Kentucky Bluegrass thrives best on soils that are well supplied with lime; and it will make the use of 10-10-10 or other high nitrogen fertilizer more available.

And now what about soil testing as a pre-requisite to soil building credit for the use of lime and the ASC program? I stick to the premise that we must follow these technical aids we have developed. To abandon the soil test as a means of predetermining the need for lime is to go back to the old "by-guess and by-gosh" system of 40 years ago. I, for one, will hold out for soil tests as a pre-requisite to lime recommendations in the state of Wisconsin; and I'm willing to accept all of the inconsistencies of variation both in test and recommendation, which in my opinion won't amount to a fraction of 5 percent.

Too Much Red Tape

I do feel that the present program of soil conservation as administered under the ASC has been shackled with too many mandatory requirements and too much red tape, and I have done everything humanly possible to try to get our state committeemen to relax their mandatory requirements on fertilizer usage as a pre-requisite to credit for lime, but I am certainly going to stick to soil tests both as a basis for lime requirements and as well as an aid in predetermining the need for phosphate, potash, nitrogen and the trace minerals. "Test! Don't Guess!" is still our battle cry in Wisconsin. In fact, I think the soil test requirement has done and will continue to do more to "sell" lime than any single thing we can do to promote sales. After that, it's up to the producer to go down the country road and "get the farmer on the dotted line."

2300 ft. underground

7 Rear-Dumps haul million tons of limestone yearly

Imagine yourself with the problem that faced a large Eastern chemical company a few years ago.

Your plant needs thousands of tons of limestone daily for manufacture into agricultural lime and cement, and for chemical processing into chlorine, soda ash, and other products. Much of your stone has to be shipped in. Transportation prices are boosting your costs.

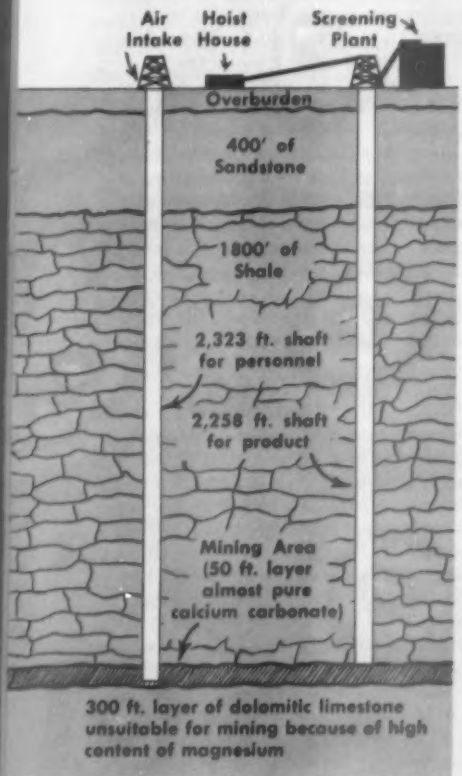

Air Intake
Hoist House
Screening Plant
Overburden
400′ of Sandstone
1800′ of Shale
2,323 ft. shaft for personnel
2,258 ft. shaft for product
Mining Area (50 ft. layer almost pure calcium carbonate)
300 ft. layer of dolomitic limestone unsuitable for mining because of high content of magnesium

Diagram shows the two 8′ x 17′ shafts. One carries men and equipment, the other brings crushed limestone to the surface. Shafts also carry in 100,000 cubic feet of fresh pumped air every minute. They also take out blasting and diesel fumes. The natural mine air is dry . . . no water drips from ceilings or seeps through walls. Temperature stays 80° year-round. Cave-in dangers are absent . . . strength of the limestone sidewalls, plus arching effect of 2,000 ft. of rock above, eliminates need for shoring or other artificial bracing.

With these difficulties, you'd undoubtedly do what this company did — look for a nearby source. You'd probably never guess what would turn up. Some 2,300′ below your own backyard, under clay, shale, and sandstone, your drills would run into a 50′ layer of almost pure limestone. Satisfactory material, tests showed, for all your needs. But how could you get to it?

Sink two 2300′ shafts

This company answered that question by borrowing some ideas from underground ore and coal miners. First, they drove two 8′ x 17′ steel-and-concrete-lined shafts vertically to the limestone bed. Then, they developed a network of underground roads (now totaling 19.9 miles) to a centrally-located crusher. Next they equipped the mine with 4 electric shovels, 9 drilling rigs, a tractor, 4 loaders, 4 trucks, and a bus to move 80 workers to their assignments.

For hauling, they chose 7 LeTourneau-Westinghouse Rear-Dumps, 16-ton models with bodies built up to hold 20 tons. These units, company officials figured, would be ideal for underground use, because they could turn non-stop anywhere on the narrow 32′ roadways — and their simple rugged construction would reduce repair work.

Assemble machines on mine floor

Then came another problem: how to get these big Rear-Dumps into the mine, nearly ½ mile below? LeTourneau-Westinghouse engineers helped out here. The rigs were shipped to the plant tack-welded. Wheels and prime-movers were separated and lowered down the shaft. Truck bodies, too, were cut apart and lowered. Re-welds and re-assembly were made on the mine floor, and work was started.

With the 1½-yd. shovels loading well-blasted limestone, each Rear-Dump gets 20-ton heaped load in about 2 minutes. Haul of 3,000′ one way over the level underground roads is made in 2nd and 3rd gear (7 and 13 mph); return in 3rd. The 7 Rear-Dumps average 3,600 tons of limestone per 16-hour day . . . over a million tons per year. Short turns with power steer have proved a major advantage in speeding spots at shovel, for backing to dump into hopper, and for maneuvering in all tight spots.

Another advantage these Rear-Dumps have given is safety. *Each* of the 4 wheels has more braking surface than *all 4* wheels on most haulers. Operators travel confidently at high speeds.

A third advantage . . . there has been practically no downtime for tire troubles on the Rear-Dumps' big single pneumatics. In 4 years of single and double-shifting the 7 units, only one blowout has occurred. Sets of tires have lasted as long as 7,000 hours without recapping, despite the rough pit floor and heavy 20-ton loads. Plant records show over-all mechanical efficiency for all the Rear-Dumps of 96%.

You, too, can lick your hauling problems with LeTourneau-Westinghouse Rear-Dumps. Ask for a demonstration on your job. There's a size to fit your needs . . . 9, 18, 35, and 50 tons.

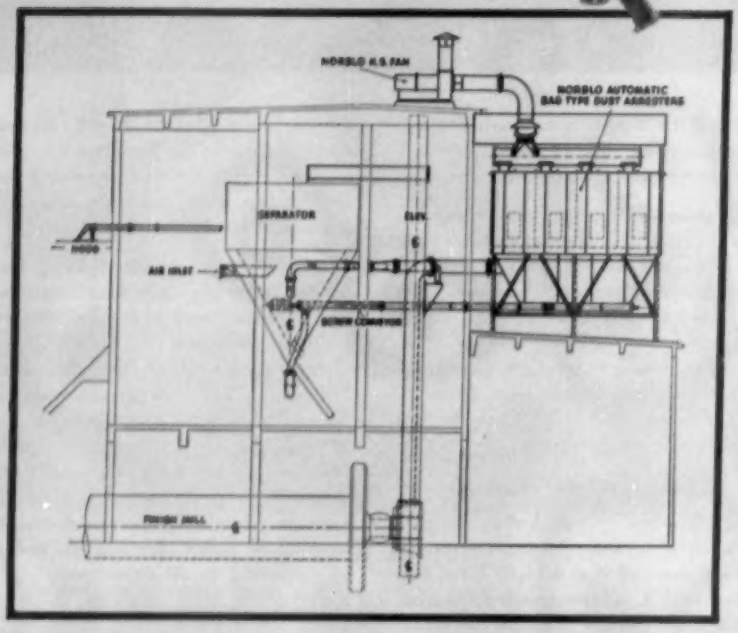
LeTourneau-Westinghouse Company
PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company
E-664-Q

Norblo

Cement AIR Cooler

and Dust Collection System

Increases finish mill efficiency
Improves operating conditions



Cement temperature reduced to 200° or lower

The main facts of importance to you as a cement mill operator are found in the display headings above. They've been proved by actual performance in hundreds of American and foreign mills.

Norblo positive temperature control during the entire grinding process eliminates higher temperatures which damage the finished product. Cooling also increases the efficiency of the mill and separation system, and promotes safety of workmen, equipment and product.

How the Norblo Patented Cement Air Cooler as combined with Norblo Automatic Bag Type Dust Collector cleans up the entire milling process is fully described in our Bulletin 165-1. Write for it today.

The Northern Blower Company
Engineered Dust Collection Systems for All Industries
6408 Barberton Ave. OLympic 1-1300 Cleveland 2, Ohio

Agstone Producers' Problems

(Continued from page 79)

soil test is essential both for limestone and fertilizer and I believe that as time goes on there will be more and more testing. Through the years much experimental work has been done. In fact so much has been done in the way of demonstration and so forth that the use of agstone and fertilizer is no experiment, but the only way to know the need for either or both from my own experience is to test the soil. I can see no just argument against mandatory soil testing providing there are enough facilities set up and by this it is going to require a testing service in every county to really get results. I can see no just cause for not allowing members of the industry, who can qualify, making this test."

VIRGINIA: "It is my opinion that the soil test has not adversely affected our business and in the long run I believe will prove beneficial in that it will bring to the farmer's attention the advantage of using a high grade product rather than a low grade one. Therefore, I certainly believe that this requirement is sound and will be very helpful in the long run to the producers of a good quality limestone."

ILLINOIS: "The mandatory soil test has had some effect on our business, but has not been too detrimental. Our dealers complained about the delay, sometimes as long as three months, in receiving the results on samples submitted. Some dealer effort has been made to set up approved soil-testing laboratories, which they hope will reduce this delay. There is considerable discussion on the necessity or value of these mandatory tests, but we believe in most cases farmers in our territory do not over lime."

MICHIGAN: "Regarding the mandatory soil test, we believe that on the whole this has proved neither detrimental nor beneficial. It depends upon the county in which the program was used. Some of them reported improvements; others reported a slowdown in the use of agricultural limestone. Personally we believe this requirement is sound and that it will be helpful in the long run to the over-all liming program."

PENNSYLVANIA: "From the fact that our tonnage is up it would appear that soil testing for the program has helped the business. Actually it has caused us more expense for the same amount of business. The mandatory soil test is not sound in the long run because farmers resent the test. We feel that soil testing is a very sound practice and we have had our own testing laboratory for over six years. We do not like the mandatory soil test because it discourages farmers who, being some-

At National Stone Company's quarry in Joliet, Illinois, Tournatractor's main job is dozing overburden into a worked-out pit. Pushing 2½ yds. of wet, sticky clay mixed with rock, unit regularly completes a 190' cycle every 40 sec. "Well-pleased," says Owner Paul Lambrecht, who also "likes Tournatractor's matched speed as a pusher for rubber-tired equipment."

No stops for shifting... *no lost momentum...*

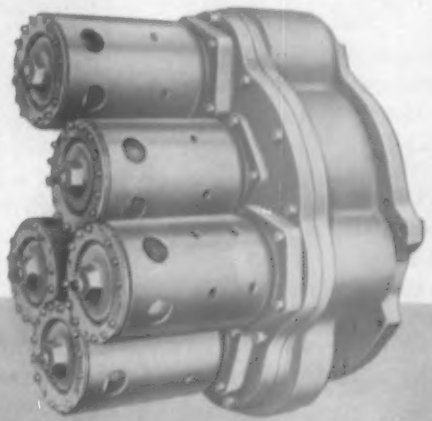
any gear ratio instantly with Constant-Mesh Transmission

Constant-mesh transmission makes a major contribution to Tournatractor's high-speed performance. It gives faster pickup for pushing or pulling scrapers, or other loads . . . permits easy synchronization of Tournatractor speed and power with that of the scraper prime-mover so two engines work as a team for fast pusher-loading. It helps you take full advantage of Tournatractor's new high speeds to handle more jobs, get more work done.

With constant-mesh transmission you eliminate depressing of a clutch foot-pedal. You have no double clutching . . . no synchronizing for meshing of one gear against another. Quick movement of a small speed selector lever transfers power instantly from one gear ratio to another.

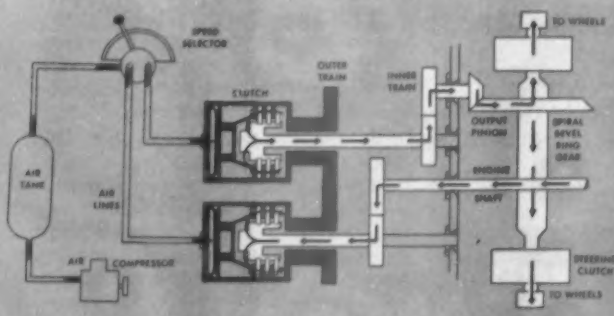
Tournatractor transmission is fully enclosed and operates in a bath of oil. All adjustment and lubrication points are conveniently located for quick, easy accessibility.

Call us to arrange a demonstration on your job. See for yourself the advantages you get from Tournatractor's constant-mesh transmission, 208 hp, 19 mph speeds, and rubber-tired mobility. See also how Tournatractor's optional, trouble-free, low-pressure torque convertor gives you the additional advantage of maximum horsepower at all times over the complete speed range.



Transmission Clutches Air-Actuated for Instant Control

Constant-mesh transmission and air clutch assembly are installed as a single unit. Clutches are mounted individually on ends of the gear shafts. Each 7" multiple disc clutch has 290 square inches of gripping surface. These heavy-duty clutches engage and release in proper combinations at a touch of the control lever. To make clutch adjustments all you do is loosen a few Allen-head screws and turn adjusting ring "in" or "out." Tournatractor also has 2 air-actuated steering clutches which are similar in principle.



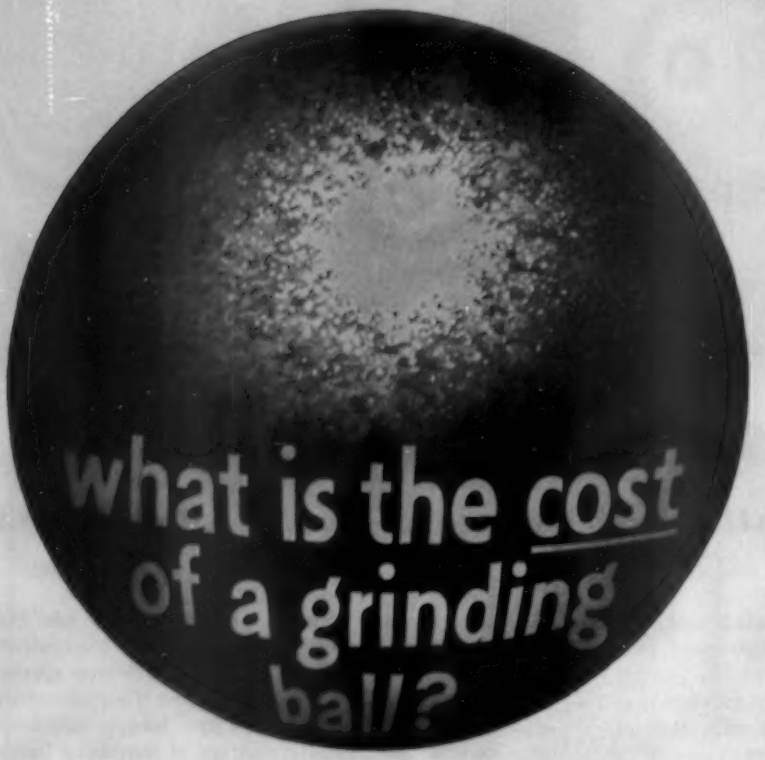
Arrows trace power-flow through CONSTANT-MESH TRANSMISSION

Tournatractor—Trademark T-736-G-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company



The cost of a grinding ball is determined by three things: initial cost, grinding ability and wearability.

You'll find that every CF&I Grinding Ball is your best buy. Initial cost compares favorably with that of other grinding balls. Grinding ability is improved by the use of special analysis steel and by suitable heat treatment resulting in a balance between toughness and hardness. Homogeneity of the balls is maintained, resulting in even wear with self-rationing and a more effective grind. The cost per barrel of cement produced is what really counts. Available in sizes from ¾ inch to 5 inches.

For full details, contact our nearest sales office.

other CF&I products for the cement industry

Wickwire Rope
Mine Rails & Accessories
Cal-Wic Industrial Screens

CF&I

FORGED STEEL GRINDING BALLS
THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver
Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • New Orleans • New York • Oakland
Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco
Seattle • Spokane • Wichita
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Montreal • Toronto • Vancouver • Winnipeg 2652

what of an independent group, greatly resent anything of a compulsory nature. We do feel that the testing program has achieved better and more uniform sampling of our soils than previously, and as a result many of our soil experts have really changed their tune about liming requirements for the state. In one county we serve, statistics for fields sampled for lime changed from 55 percent not needing application to 12 percent in a matter of six months. This was brought about by more uniform sampling of farms.

"We feel that we would only have had 50 percent of our 1954 tonnage had we not gone to the trouble and expense of taking samples for the farmers. Many theories have been advanced for the decrease in participation over the state and adjoining areas, but it boils down to two things here; (1) lack of getting information to the farmer, and (2) the mandatory soil test. It is not economic conditions which some people would like to have us believe. We would like to see a rule-of-thumb of one ton per acre or if a farmer wants more have a soil test for that additional amount.

"In one county in which we work, over 50 percent of all the purchase orders we receive came from farmers for whom we had pulled a soil sample and taken it in to the regulatory testing place for that county. From October to December 84 percent of all the purchase orders we received in that county represented soil samples we had pulled personally. The increase percentagewise is due to the fact that early in the year we felt that we couldn't possibly pull samples for all the farmers, so we made personal contacts and promotional work in which we encouraged the farmer to pull his own samples. From this standpoint we feel that our efforts were responsible to a large measure for the 50 percent of the farmers who did take soil samples in on their own. In fact almost all of the farmers who took in soil samples on their own were contacted by one of our representatives.

"In October we observed that the farmers were just not going to pull their own samples. We then concentrated on a farm to farm contact of the farmers who were signed up and pulled samples for them. The results were good, but they came out as we had expected; there were too many samples to pull and so many former program participants didn't participate in 1954."

SOUTHEAST: "From experience, we have found that mandatory soil tests are not as yet practical for most areas under the ASC program. No doubt this, along with various other restric-

(Continued on page 170)

IN CALIFORNIA . . . AND THE WORLD OVER

In this quarry at Colton, the powerful 150-B shovel with its 6-cu. yd. dipper has no difficulty in breaking through tough limestone.

Rock meets its master

WITH A BUCYRUS-ERIE SHOVEL ON THE JOB

In a California quarry, this Bucyrus-Erie 150-B shovel is digging and loading hard limestone, delivering outstanding output. This performance story is being repeated daily in quarries, mines and on heavy-duty construction projects throughout the world.

New front-end design, extra-strong construction, and advanced engineering of Bucyrus-Erie Ward Leonard electric excavators give owners that extra margin of output that pays off in profits. 24L54

GLOBAL APPROVAL

MOROCCO · PHILIPPINES · RHODESIA · UNITED STATES · VENEZUELA · ALGERIA · CANADA · CONGO · ENGLAND · FINLAND · FRANCE · INDO-CHINA

110-B 4½-cu. yd.
150-B . . 6-cu. yd.
190-B . . 8-cu. yd.

BUCYRUS ERIE

Bucyrus-Erie Company

South Milwaukee, Wisconsin

Let us put all the facts into your hands

Write for CATALOG NO. D-5415

...and at your fingertips you'll have important data on the champion producer of aggregate

DIAMOND "77"
CRUSHING AND SCREENING PLANT

Sets Performance Records Wherever It Works

This mobile unit is without a peer in either strength or in aggregate producing ability. Learn how Diamond's line-flow, rotor-lift principle can give you high crushing capacity and uninterrupted flow of material.

Write us now for name of the Diamond Distributor in your territory. Find out how you can increase production and profits.

Everything for the aggregate producer

DIAMOND IRON WORKS
division
GOODMAN MANUFACTURING COMPANY
Halsted Street and 48th Place • Chicago 9, Illinois

Agstone Producers' Problems

(Continued from page 168)

tions, resulted in reduced farmer participation in ASC.

"It should be pointed out in regard to soil analyses which are completed for farmers for use in participation under the program, with the understanding that limited funds are available for assistance to farmers, and, in most cases, limited funds are available by the farmers, recommendations or requirements for amounts of materials are generally made on a near minimum basis."

MISSOURI: "The mandatory soil testing has adversely affected our business. While we believe soil testing would be helpful to farmers in the long run, it is nearly impossible to get farmers to follow out all these added federal requirements."

OHIO: "I do not think that the mandatory soil test had adversely affected us. In Ohio in lieu of the soil test the farmer was allowed two tons per acre, providing the field had not grown alfalfa or sweet clover satisfactorily during the past four years. Most of the farmers took their limestone on this basis.

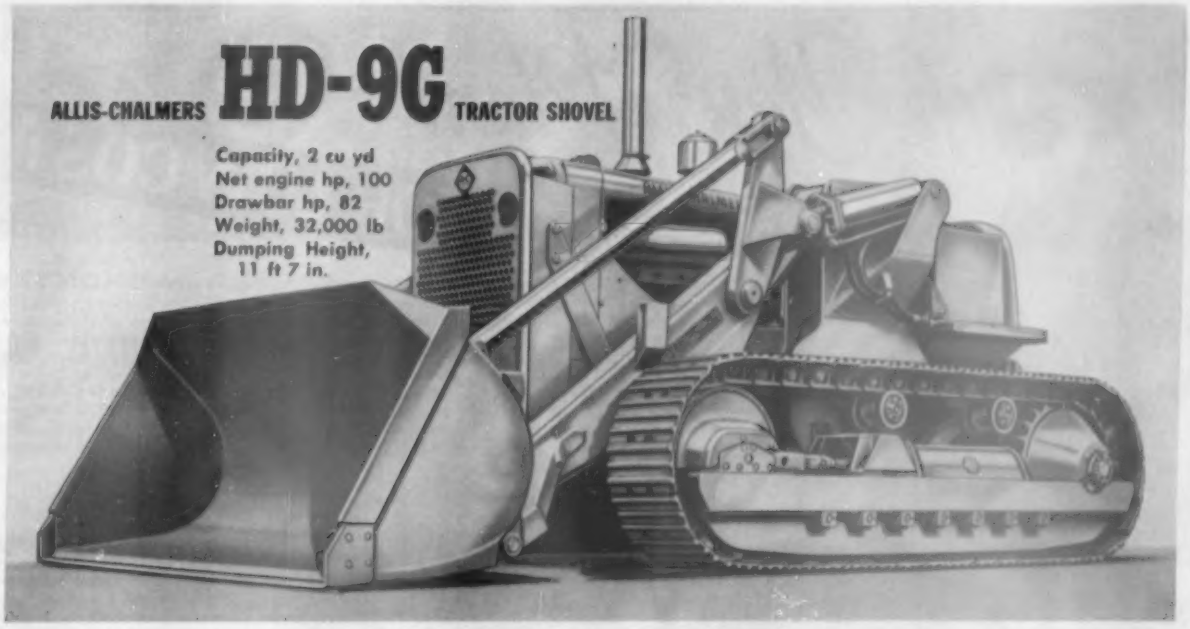
"There is nothing wrong with the principle of testing soils for their lime requirement. There might be some question as to the accuracy, if all factors are not taken into consideration. For years we have advocated that farmers have their soils tested and have done a great deal of testing ourselves. At least the present tests are a good indicator as to the lime needs of soils in most instances."

TENNESSEE: "The mandatory soil test has made our sales fluctuate somewhat, however, we have got to realize that we must have some sort of a yardstick to go by. Using the soil test along with farm history and crop performance data, it will prove very beneficial. True, the mandatory soil test has created a state of confusion, and this confusion has been agitated, but upon modification and the folks becoming more familiar with it, and when more accommodations are set up, it will become a valuable and useful tool."

MARYLAND: "We believe that the mandatory soil test is sound, if used intelligently. For example, if the soil test indicates that a farmer needs four tons of agricultural limestone to the acre, that farmer should be paid on this basis, and not have a limit set, at say, one ton per acre regardless. This is defeating its very purpose.

"The principal handicap in 1955, unless there are administrative changes in the ASC program, will be the red tape involved with soil testing. We

(Continued on page 174)

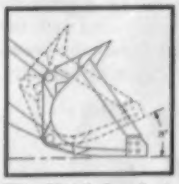


POPULAR 2-YD HD-9G TRACTOR SHOVEL NOW OFFERS

Higher Work Capacity

Design refinements in the Allis-Chalmers HD-9G now make it even more productive than ever. First, the net engine output has been increased to 100 hp, with 23,000 lb of push for extra crowding and digging ability, fast work cycles.

Streamlined bucket design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more pay load where it's wanted. Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.



A new addition to the wide variety of attachments available for the HD-9G Tractor Shovel is the Tip-Back bucket which allows the operator to roll the bucket back approximately 25° at ground level. Ideal for handling greater capacities of loose stockpiled materials, the Tip-Back bucket can be carried lower to the ground for greater stability . . . can load bulky objects easier.

New-type ceramic master clutch lining reduces lever pull, makes it easier for the operator to do more. The new HD-9G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

Lower Operating Cost

Design improvements also add longer life to the HD-9G under all work conditions. Heavy box-section booms are 50 percent stronger, assuring proper alignment even working in the toughest materials. The low design of the new HD-9G combination stabilizer and cowl not only offers easy accessibility for maintenance and service, but contributes to maximum operator vision. New ceramic master clutch lining operates longer between adjustments, increases clutch life.

Hydraulic system provides new maintenance simplicity, safety of operation, as well as improved visibility. With new-style tank, there are few external fittings, greatly reducing possibility of outside leaks. Magnetic filters and suction-line screens protect the entire system from damaging grit. New, improved hydraulic pump is designed for long life as well as fast and accurate bucket action.

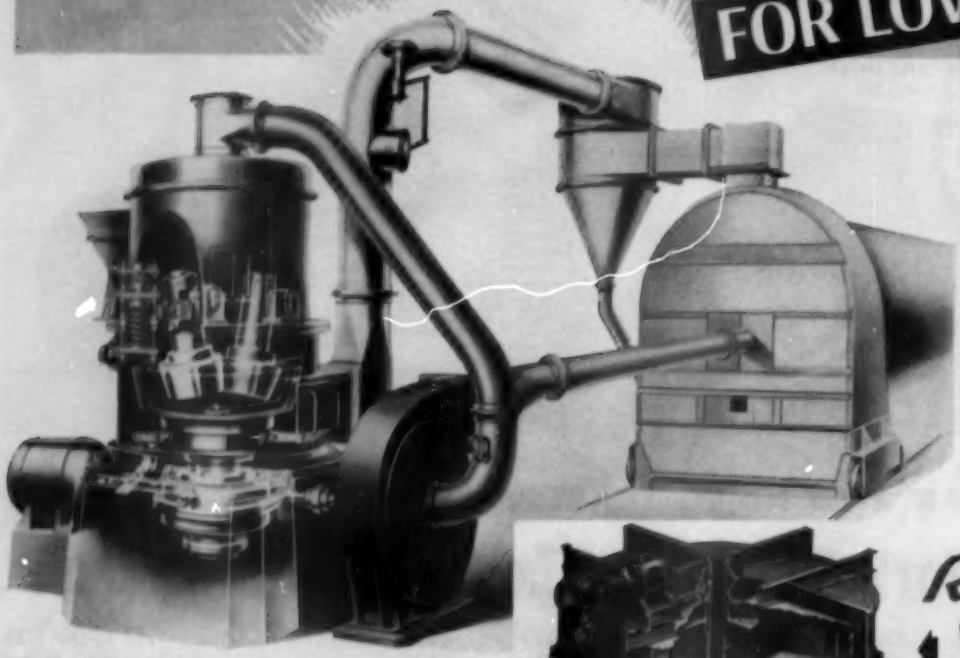
Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.

☆ ☆ ☆

See your Allis-Chalmers dealer for further information on what the HD-9G can do for you — or a demonstration right on your job.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

Equip Your Plant FOR LOW COST



Raymond BOWL MILL FIRING

This modern unit is a complete and coordinated system of coal pulverizing and direct firing for rotary kilns. It insures high level kiln efficiency by providing flexible firing control and instant response to changing load conditions.

Handles coal of any grade or moisture content.
Easily adjusted or lubricated while operating.
Sturdily built for continuous 24-hour service.
Centralized controls simplifies supervision.
High availability—economical performance.

Over two thousand installations have proved the dependability of the Bowl Mill. For detailed information, write for Raymond Catalog No. 75.

Raymond WHIZZER SEPARATION

Specially adapted for classifying hydrated lime and pulverized limestone. Whizzer separation provides close fineness control; insures a uniform product. When used in a closed circuit grinding operation with a pulverizing unit, the Raymond Separator greatly increases mill capacity.

Raymond LABORATORY SEPARATOR

Complete motored unit for classifying test samples. Efficient in fines extracting operations and checking the specific surface areas of various grades of material for product control.

RAYMOND Bulletins or Catalogs sent on request giving details of individual machines.

C-E

SALES OFFICES IN PRINCIPAL CITIES

COMBUSTION

RAYMOND DIVISION

PULVERIZED LIMESTONE, AGSTONE AND HYDRATED LIME

RAYMOND equipment has served the non-metallics industry for over sixty-five years. Today the modern and dependable line of Raymond machinery is successfully operating throughout the entire lime products field—from kiln firing to the superfine pulverizing and classifying of various types and grades of finished materials.

A wide range of Raymond Mills and Separators is available for meeting all production requirements—capacities all the way up to 30 tons or more per hour—finenesses up to 99.9% passing 325-mesh—Flash Drying accessories for mills that dry and grind in one simultaneous operation.

Raymond
WHIZZER ROLLER MILL

An economical unit for finish-grinding agstone, burnt lime, phosphate rock and other non-metallic minerals. Can be equipped with Flash Drying for removal of moisture while pulverizing.

Raymond
AUTOMATIC PULVERIZER

THE standard "lime mill" of the industry for more than half a century. Disintegrates, classifies and refines the product by rejecting impurities automatically. Makes all grades in a single unit of equipment.

Raymond
SUPER ROLLER MILL

Provides practical advantages over multiple mill units for handling large capacities of 15 to 20 tons or more per hour of finely ground material.

- Conserves plant space
- Centralizes operations
- Simplifies material handling
- Saves on installation, maintenance and supervision costs.

Refer your pulverizing problems to Raymond engineers — more than 65 years' experience at your service.

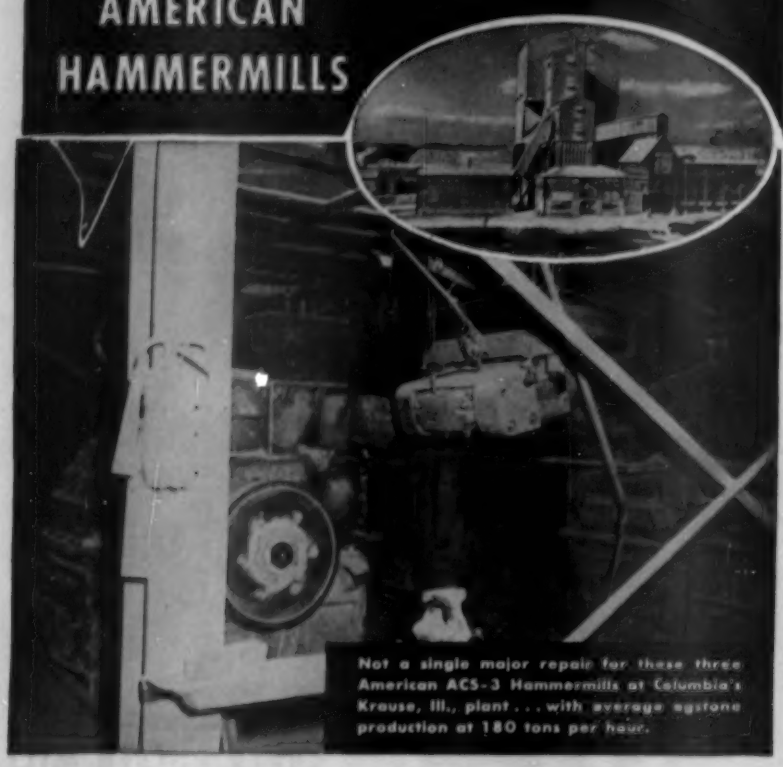
SINCE 1887

ENGINEERING, INC.

1307 NORTH BRANCH STREET • CHICAGO 22, ILLINOIS

Leading Agstone Producer Turns Out 717,909 Tons in 30 Months with . . . . .

AMERICAN HAMMERMILLS



Not a single major repair for these three American ACS-3 Hammermills at Columbia's Krause, Ill., plant . . . with average agstone production at 180 tons per hour.

The Columbia Quarry Company, a pioneer in the production of agricultural limestone, is producing today what is believed to be the world's largest single agstone output. In one year, they have shipped over 5% of the national tonnage. With this background of rock-crushing experience, Columbia has chosen to install American Hammermills in its three plants at Krause, Ill., Valmeyer, Ill., and Elsberry, Mo. At the Krause plant alone, three Americans have produced over 717,909 tons of agstone in the first 30-months—even though feeding on exceptionally hard Lower St. Louis Limestone.

Since their installation, *not one major repair* has been necessary on these Americans—in fact, no attention at all, except for the routine refacing of hammers and grate bars.

Nothing on the market today can equal these rock-hungry American ACS-3's for capacity, durability, or low cost of operation. Get all the extra-profit facts today. Write for free Bulletin "Better Stone Crushing".

American PULVERIZER COMPANY

1245 MACKLIND AVE. • ST. LOUIS 10, MO.

Agstone Producers' Problems

(Continued from page 170)

estimate that approximately 25 percent of the farmers just are not going to apply for any limestone at all if they have to send soil samples to a state university, which may be held up for some time, and still be limited to the amount they can use for which payment can be made, even though the soil tests show more is needed."

MISSOURI: "The mandatory soil test has affected our business adversely, since the farmer was not able to spend all the money required to obtain his allotment required by the mandatory soil test."

ILLINOIS: "The mandatory soil test has undoubtedly retarded sales in some instances. However, I do not believe that this has substantially affected the volume of limestone sales. I believe that the requirement is sound and has long-term benefits. However, a more liberal program would appear to be more tasteful to the farmers."

TENNESSEE: "We do not believe the soil test should be mandatory as most farmers, particularly those who have lived on their places for a number of years, know what particular field or fields need limestone. We think that those who want to have a test made may find it beneficial, but we are very glad that our state is not making the soil test mandatory this year."

IOWA: "The mandatory soil test is in our opinion a sound requirement but the failure to supply enough soil testing stations has really hurt. It takes about two months in this area for a farmer to get a soil test from an approved government testing station. This should be speeded up."

IOWA: "I believe the mandatory soil test is the greatest factor in reduced tonnage. The second factor which contributes to the reduced tonnage is that the farmers are not kept informed or do not understand the ACP program. It is even a problem for us as the program changes from year to year and even within the year.

"In theory, of course, the soil test is the obviously perfect way to handle our program. But from there on it loses most of its value and is even harmful. We are certain that we can question its validity. Whereas we once were certain that we wanted a pH of 5.5 or 6 we now find that in many cases a pH of 6.5 or even 7 is more desirable. We were at one time very concerned about over-liming. We now find that in some soils it is almost impossible to overlime. The recently completed test in Wisconsin showed that with 15 tons per acre the point of diminishing returns on their particular soil was not reached."

JUST OFF THE PRESS...
You'll want this New Bulletin No. 7502

This new Bulletin No. 7502 describes the Dorrco FluoSolids* system for drying, sizing or heat treatment. It explains how it works, the advantages, operating results and typical applications.

For your free copy just drop a note to Dorr-Oliver Incorporated, Stamford, Conn., or in Canada, 26 St. Clair Avenue East, Toronto 5.

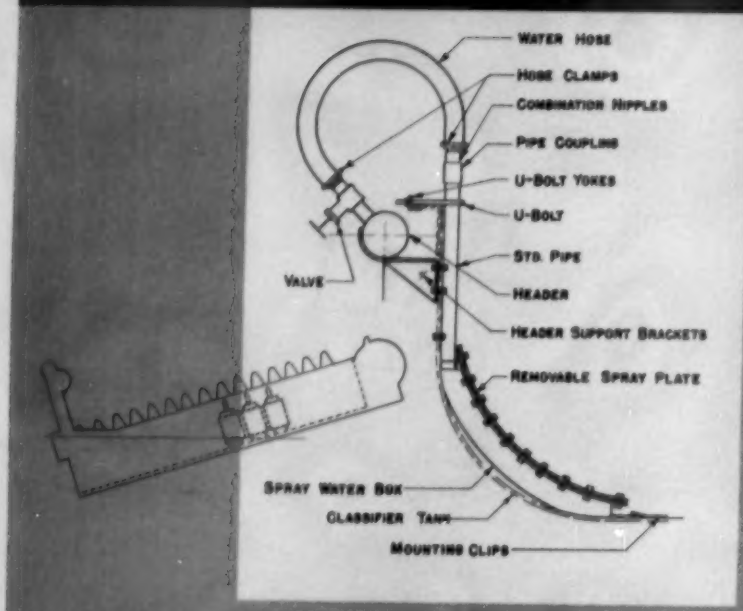
*Trademark Reg. U.S. Pat. Off.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

spray water box attachment on

AKINS Classifier

solves difficult sand-washing problems



The Akins Spray Water Box was developed by Colorado Iron Works Co. in 1937 and has proved to be particularly valuable in cases where adhesion of slime particles to sand is so persistent that a clean separation cannot be made by normal classification.

Spray Water Boxes, generally furnished in multiple assemblies, are easily and quickly bolted to the standard Akins Classifiers and are placed at the lower end of the drainage deck. The top spray plate is gasketed and bolted for quick, easy removal and replacement when spray holes are blinded.

COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

A. R. WILFLEY & SONS, Inc.
Denver, Colo., U.S.A.
New York Office: 1775 Broadway, N.Y.C.

Buy WILFLEY for Cost-Saving Performance

WILFLEY centrifugal PUMPS

ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

Rocky's Notes

(Continued from page 53)

draulic properties of some early American natural cements. Yet on the basis of the Newberrys' work it seems to have been the practice ever since to exclude MgO as having any possible useful reaction with silica or alumina in portland cements.

Chapter 14 on "Systems Containing MgO with CaO, Al_2O_3, SiO_2" contains nearly all the data on magnesia which appears in the index. These concern the phase relationships of melts of various combinations, which are of interest in developing systems that could conceivably form in cement clinker. It seems from the data here given that while it is possible to form a melt of CaO • MgO • SiO_2, this can't occur in portland cement because the CaO combines preferentially to form C_3S, and as long as there is enough CaO to form C_3S, the MgO can only come out uncombined as MgO (periclase). In the system CaO-MgO-Al_2O_3-SiO_2-Fe_2O_3, when the temperature is high enough to form a liquid, MgO up to 5 percent will be dissolved, and if cooled rapidly will remain in solution in the glass; if cooled slowly it comes out as perceptible periclase. This, of course, explains one reason for the present practice of quick cooling of clinker. In these chapters on phase relationships a chemist experienced in blast-furnace slags would find many analogies. In the presence of alumina and iron oxide, MgO probably enters combinations which contain no periclase and hence no MgO in harmful form. The chief difference between blast-furnace slags and cement clinker is that the slags rated by standards of clinker composition are very much *under limed*. Hence the MgO is given an opportunity to combine with the other oxides which it does not have in portland cement raw mixtures, that usually come near to being *over limed*.

New Data on Hydrates

The most interesting, and to the lay reader probably the most useful, part of the book is on the products of hydration of portland cement. This is a field in which the greatest progress recently has been made. The results are apparently based on studies of calcium silicates that are completely hydrated or hydrolized. Various methods are used to accomplish this, which of course would never be used in actual use of cement. This means that all the silica is reduced to silicate ions, $Si(OH)_4$ or H_4SiO_4 and all the calcium hydroxide to $Ca(OH)_2$ ions. There still is doubt as to how many stable calcium-silicate hydrates exist, but the

(Continued on page 178)

New Money Maker for your job . . . Ford Tandem Axle T-800 BIG JOB takes payloads (with body) to 30,010 lbs.—up to 2 tons more than other trucks in this class. Short Stroke 170-h.p. V-8. Rubber-bushed rear suspension. Heavy duty 11,000-lb. front axle for greater front-end capacity, full-air brakes and auxiliary transmissions available. Power Steering standard.

To get the most for your money

LOOK UNDER THE HOOD!

Make sure your next truck has a modern short-stroke engine—that gives gas savings of up to 1 gallon in 7 . . . prolongs piston ring life up to 53%. Only Ford offers Short Stroke power in every engine.

Short Stroke engine design for trucks is making headlines. In some makes of trucks it's still in a development stage. In others, it has reached the early production stage. *But only in Ford Trucks has it been advanced by over 3 years of experience and more than 5 billion miles of service.* Only Ford Trucks offer Short Stroke design in every engine, V-8 or Six, *for EXTRA long life!*

Look under the hood for gas-saving Short Stroke power. Look behind the wheel for driver-saving *Driverized* Cab comfort. Look over the axle for trip-saving payload capacity. Ford Triple Economy Trucks give you all three! Call your nearest Ford Dealer now for complete information.

Look under the hood for an engine with a "stroke" as short as, or shorter than its "bore." That's a modern *short-stroke* engine—the *Ford* kind of engine that gives you: reduced piston travel and piston speeds . . . up to 33% less friction, more usable power . . . gas savings up to 1 gallon in 7 . . . less wear on vital moving parts and much longer engine life!

Ford Triple Economy Trucks

THE MONEY MAKERS FOR '55

PROVEN RUGGEDNESS
for toughest crushing
Year in and year out you find more Farrel-Bacon crushers in really severe service than any other make on the market. When you examine these machines, you understand why.
The answer lies in the extremely simple mechanism and extra rugged construction of both frame and working parts. Also, Farrel-Bacon crushers, even after many years of the most abusive service, can always be brought back into first class condition, by re-babbitting, rebushing or truing up parts—at minimum cost.
Because they last so long, investment cost per year is exceptionally low.
Sizes: 60" x 48" to 10" x 7". Write for complete information or engineering assistance
FARREL-BACON
Ansonia, Conn.
BA-7

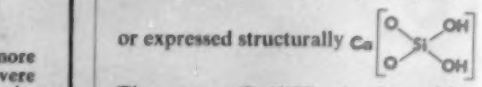
ROCK PRODUCTS

IS READ BY THOSE WHO BUY YOUR PRODUCTS

●

Rocky's Notes

(Continued from page 176)

weight of evidence appears to be that there is one fundamental silicate ion, which can be written $Ca[SiO_2(OH)_2]$, or expressed structurally 

The excess $Ca(OH)_2$ is then either adsorbed on or in solid solution with these silicate ions. The molecular or cell structure may apparently be either in plates or fibers, but in either case the particles are so small as to be colloids. These aggregations may be the ultimate binding material in cement and concrete. The other hydrated oxides greatly complicate the final product of set and hardened cement paste, and may be helpful or otherwise.

Some of these recent research data on the calcium-silicate hydrates is contained in the recently issued publication of the Portland Cement Association Paper No. 69, "The Calcium Silicates Hydrates," by Dr. Bogue, being a discussion presented at the International Congress of Industrial Chemistry, Brussels, Belgium, September, 1954. We shall attempt to abstract and discuss this paper in a subsequent issue.

Labor Relations

(Continued from page 55)

the contract the employe was properly denied the job of Tube Stitcher.

Union's Argument

"The union alleges that the employe was improperly denied the job of Tube Stitcher.

"It was pointed out that he has worked in this plant for 14 years and has acted as relief man on the Tube Stitching machine for four years. His qualifications in terms of seniority and ability to do the specific job cannot therefore be questioned, according to the union.

"The union claims that the only reason why he has been denied the job of Tube Stitcher is because he had filed a compensation claim for the skin irritation. If he had not filed this claim, according to the union, he would not have been denied the job of Tube Stitcher.

"The union points out that nine out of ten men in the plant suffer from skin irritations particularly in the summer time when they perspire. These irritations cause an itch which is annoying to the men but in no way disable them. The employe in question, it was pointed out, has not lost any time from work because of the skin irritation.

"The union alleges that this em-

P&H Model 655-B; 1½-yd. capacity. P&H builds the world's most complete line of Power Cranes and Shovels.

P&H . . . 20 YEARS AHEAD with welded construction!

Think of it! . . . 20 years ago P&H threw out the old patterns to give you a new and better kind of power shovel — *completely welded of rolled alloy steels!*

Twenty successful years in the field have proved beyond all doubt the advantages you gain through greater strength and the elimination of dead weight. Today's P&H machines give you faster cycles, still more dependable service — still lower yardage costs. Behind today's machines is P&H's long experience in welded design and construction — still 20 years ahead of the field.

All-welded construction is only one of many major improvements originated by P&H. There are others that will earn you more money than is possible with older style machines you may now be using. Get the facts from your nearest P&H dealer. P&H Power Crane and Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wis.

HARNISCHFEGER

See your P&H *dealer*

"Your P&H Dealer has the experience, the organization and the facilities to serve you reliably in every way. He's ready to deliver the kind of on-the-ground service that keeps your jobs moving on schedule. Your P&H Dealer is tops in the business. Get to know him."

the P&H *line*

you can grind Specification Sands
for less than 25¢ per ton
with
MARCY* CPD MILLS

Typical installation of 5' x 12' Marcy CPD Rod Mill

AND GET ALL THESE ADVANTAGES

- **low cost**... maintenance is low—overall cost of mill operation, exclusive of amortization, is generally less than 25c per ton.
- **flexibility**... by varying rate of feed, pulp dilution and discharge port area it is possible to change gradation of finished product to meet different specifications.
- **better product**... feed enters both ends, discharges at center. Material moves rapidly through mill, and cubical shaped particles are produced with a minimum of fines.
- **wet or dry grinding**
- **capacities from 2 to 200 dry tons per hour.**

*Both Marcy and Massco are registered trademarks.

WRITE FOR CATALOG

The Mine & Smelter Supply Co.
DENVER 17, COLORADO

T.C.
WOVEN WIRE SCREENS
ACCURATE • DURABLE • ECONOMICAL
The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings—from 10 mesh, .035" wire on up. Write today for Catalog No. 53.
TWIN CITY IRON & WIRE CO.
35 W WATER STREET • ST PAUL 1, MINNESOTA

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

ployе developed his present condition when he was packing batts of rock wool last year which required direct contact with the rock wool. It was pointed out that the Tube Stitching job does not require contact with the rock wool. This job merely requires the operator to stitch a paper bag and the only contact with the rock wool comes from fibers that are in the air.

"It was also pointed out that the job of Stock Clerk involves the transportation of materials from the warehouse into the plant by a fork truck. It therefore follows that the Stock Clerk is also exposed to the rock wool fibers in the air in the plant.

"The additional time a Tube Stitcher would spend in the plant would not, according to the union, aggravate the irritation.

"A dermatologist, testifying on behalf of the union, stated that it is significant that this employe still has this skin condition even though he was out of the plant completely for five months during the strike. It was his opinion that it would do no harm to place the man on the Tube Stitching job and see what results. In any event, according to Dr. Levy, even if there were an aggravation it would be very slight and would not either disable him or interfere with subsequent treatments.

"The union also argues that if we follow the principle that a company has the power to refuse a man a job on the basis that it might result in a compensable injury it would destroy all job security.

"The union disputes the company's claim that Article 16, paragraph 8, is applicable to the present situation. The union points out that this paragraph is only applicable 'in the event of a machine stoppage.'

"The union also disputes the company's interpretation of Article 11, paragraph 6. The qualifications here referred to, according to the union, refer to the man's skill only.

"The union concludes that this employe was improperly denied a job of Tube Stitcher and that he is entitled to the differential in pay between the wage for Tube Stitcher and the Stock Clerk retroactive to the date he was denied the job of Tube Stitcher.

Arbitrator's Decision

"The question at issue is whether, under the provisions of the contract between the parties, this employe was improperly denied the job of Tube Stitcher.

"The company claims that under Article 11, paragraph 6, he is disqualified because 'he is not reasonably qualified to do the work.'

"A careful reading of paragraph 6

(Continued on page 182)

40 PAGES of helpful information

on Recovering Dusts, Fly Ash, Mists, Fumes and other Suspensions from Gases.

This booklet summarizes

the important points design and plant engineers should know about Cottrell Precipitators . . .

- Basic types of Cottrell equipment.
- Principal elements in a Cottrell unit.
- Data on Mechanical and Electronic Rectifiers.
- Various types of Collecting Electrodes (rod curtains, corrugated plates, pocket electrodes, etc.).
- Typical ways of removing collected material.
- Various Shell Constructions (steel, concrete, brick, etc.).
- The effect of various factors on efficiency and performance.
- Data on CMP (Combination Multiclone-Precipitator) Units.

. . . and many other helpful facts on Cottrell design and operation.

Latest data from Western Precipitation on Cottrell Recovery Equipment

Do you have operations in your plant where gas-laden suspensions, wet or dry, are a problem? Such suspensions may be dropping on surrounding property, causing nuisance difficulties. Or perhaps important values are being lost in stack gases that can be profitably recovered. Whatever the nature of your recovery requirements, you will find this 40-page Cottrell booklet of great help. It contains up-to-date data on the latest advancements in the electrical precipitation field – prepared by the organization that pioneered the commercial application of Cottrell Electrical Precipitators almost a half century ago and has consistently led in new Cottrell developments.

A copy of this data-packed booklet will be sent free to engineers and other executives interested in recovery processes. Send your request to our nearest office.

For nearly 50 years Western Precipitation has carried on a continuous research and development program on Cottrell Electrical Precipitators, Multiclone Mechanical Collectors and other types of recovery equipment. We are not affiliated with any other company in the electrical precipitation field except our wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. We are equipped to serve you anywhere in the United States, Canada, and throughout the world!

WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1008 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2
2252 PEACHTREE RD. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

Interior of a Hardinge 11½' x 12' Rod Mill with 85-ton rod load, 1000 horsepower.

Hardinge
ROD MILLS

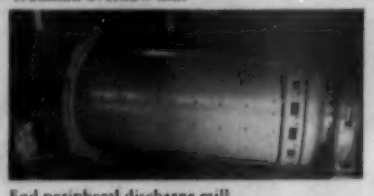
Sizes range from 2' to 11½' shell diameter and up to 1000 horsepower.

Types include trunnion overflow and peripheral discharge for both wet and dry grinding.

Applications include both open and closed circuit arrangements for ores, aggregates, concrete sand, cokes, and abrasives.

Complete specifications on request. Bulletin 25-C-7.

Trunnion overflow mill



End peripheral discharge mill

Center peripheral discharge mill

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works

New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

In a Hayward, there's no contact between the closing mechanism and the material handled. This means much less wear, reduced upkeep, big savings in bucket maintenance. THE HAYWARD COMPANY, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

Labor Relations

(Continued from page 180)

indicates that when the contracting parties agreed on this paragraph they had in mind the ability and skill to do the work. There is no evidence that it was intended to cover such things as allergies.

"The fact is that this employe has performed this work as a relief man for four years and the company does not claim that he does not have the skill to operate the Tube Stitching machine. Article 16, paragraph 4, states, 'The company shall, at its own cost and expense do everything reasonably necessary to provide for, promote and insure the safety, health and welfare of its employes in the performance of their work. This includes provisions for adequate heating and ventilating.'

"Article 16 which is entitled Miscellaneous Working Conditions deals primarily with the physical condition of the plant such as adequate heating and ventilating.

"Moreover, paragraph 8 by its very terms applies, 'In the event of a machine stoppage,' therefore it is questionable whether we can take the phrase 'Physical condition of the employe' out of its context and apply it to the situation of this employe.

"It is evident that the company is concerned about compensation claims. This is a legitimate concern of management.

"The problem, however, before us is whether the company is justified in denying the Tube Stitchers job to this employe on the grounds that its compensation costs may increase.

"It cannot be denied that in principle the company is entitled to keep its compensation cost at a minimum. However, in applying this principle, the company must use the rule of reason. It obviously cannot eliminate all risks.

"A company could possibly minimize its compensation costs by refusing to keep on its payroll anyone who has been involved in an accident. But, I am sure, that no company could function with this policy. Such a rule would be unreasonable and unworkable. It therefore follows that whatever rule the company follows must be reasonable and workable.

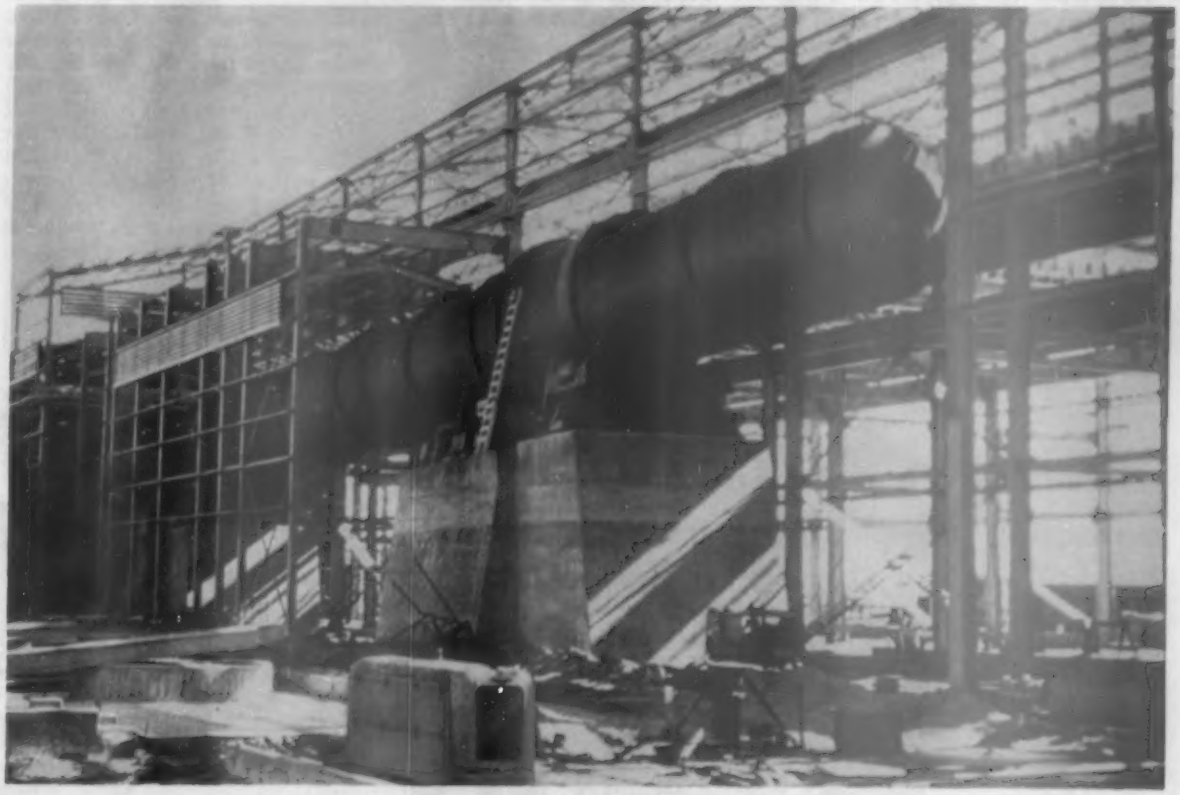
"The question before us therefore is whether the policy followed in this case is reasonable.

"I am of the opinion that it is not.

"The testimony given by the two dermatologists agreed on the possible cause and condition of the employe, but there was no agreement on what the results might be if he works at the Tube Stitcher job.

"If the cause of the condition was

ALMOST READY



and RARIN' TO GO

And once it starts, it will keep on for years and years . . .

The VULCAN KILN shown above is mammoth, and some idea of its size can be gained by comparison with the ladder resting against it. This kiln is 12′ x 175′ and is the largest ever made in the United States for the production of titanium oxide.

VULCAN equipment that has been installed, other than the kiln shown above, is a 12′ x 22′ VULCAN combustion chamber; automatically lubricated, and easily adjusted supporting and roller bearings; latest type drive machinery.

Every bit of the pictured equipment was designed, built and the installation supervised by THE VULCAN IRON WORKS.

If you are planning to build, contact VULCAN of Wilkes-Barre. VULCAN's manufacturing facilities are of the latest, their Engineering Department is fully staffed to offer you answers to any of your problems. Their 106 years of continuous business means experience. You can benefit by this experience in constructive suggestions and preliminary drawings—without obligation (as far as possible). Write today for Bulletin A-422 on Rotary Kilns, Coolers, Dryers, Retorts, and other dependable equipment. If you have a problem, VULCAN will gladly assist you.

Any information on items listed below will be sent to you immediately:

- Rotary Kilns, Coolers and Dryers
- Rotary Retorts, Calciners, Etc.
- Improved Vertical Lime Kilns
- Automatic Quick-Lime Hydrators
- Briquetting Equipment
- Open-Hearth Steel Castings
- Heavy Duty Electric Hoists
- Self-Contained Electric Hoists
- Cast-Steel Sheaves and Gears
- Diesel Locomotives
- Electric Locomotives and Larrys
- Steel Plate Fabrications
- Hydraulic Presses

VULCAN IRON WORKS

NEW YORK OFFICE
50 CHURCH ST., N.Y., N.Y.

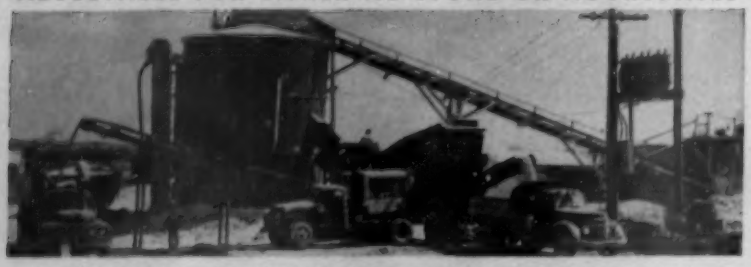
WILKES-BARRE, PA., U.S.A.
ESTABLISHED 1849

CABLE ADDRESS
"VULWORKS WILKESBARRE"

MANUFACTURERS OF ROCK CRUSHERS SINCE 1885

MOBILE or STATIONARY CRUSHERS

FAMOUS GRUENDLER TWO-IN-ONE HAMMERMILLS
ADJUSTABLE FOR EITHER AG-STONE OR AGGREGATES



Gruendler Portable Crushing Plant with dust proof and damage proof drives, producing AG-STONE and AGGREGATES in Oklahoma.

HIGH PRODUCTION
•
HEAVY DUTY
DEPENDABLE
LONG LIFE
CONSTRUCTION
•
Illustrated
Bulletins
on Request

Gruendler 3XD Hammermill Pulverizing Agricultural Lime Stone in the State of Missouri.

Gruendler Hammermill
Cass County, Iowa.

Gruendler Hammermill
Trenton, Ky.

Gruendler Hammermill
Corning, Iowa.

GRUENDLER

CRUSHER and PULVERIZER CO. • ST. LOUIS 6, MISSOURI
2915-17 NORTH MARKET ST. • DEPT. RP4 • PHONE: JEfferson 1-1220

HINGED PLATEGRIP
BELT FASTENER No. 500

Write for Circular

FOR HEAVY CONVEYOR BELTS OF CHANGING LENGTH

These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from 1/8" to 1/2" thickness. They offer special advantages in mines, quarries or industrial set-ups where length or position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

ARMSTRONG-BRAY & CO.
5316 Northwest Highway CHICAGO 30, U. S. A.

KEEP
ABREAST
WITH
INDUSTRY
TRENDS
THROUGH
ROCK
PRODUCTS

the direct contact with the rock wool then it might well be that mere exposure to air containing rock wool fibers would not aggravate the condition. There is some evidence of this since his present job of Stock Clerk requires him to be in the plant as distinguished from the warehouse for possibly 50 percent of his time without any aggravation of his condition.

"The company doctor testified that scratching has aggravated the condition of the employe's skin. It is even possible that the condition might clear up with proper treatment, which the employe has never received, and the elimination of scratching.

"It is also significant that he has worked in this plant for fourteen years and for four years he has acted as relief operator on the Tube Stitching machine and never before has he filed a claim for a skin irritation. This indicates that his allergy, if you can call it a true allergy, cannot be a serious one.

"In fact, both doctors testified that the ailment is minor, and can be cleared up with proper treatment. Moreover, it has never resulted in any lost time.

"When all of the evidence is analyzed, including the difference of opinion between the two doctors as to the effect on the employe of operating the Tube Stitching machine, we must come to the conclusion that we do not know, with any degree of certainty, what the effect will be if he is permitted to operate the Tube Stitching machine.

"Under these circumstances it would be more equitable to permit this employe to do the work of a Tube Stitcher and watch the results. In the meantime, he should have proper treatment for the skin irritation.

"The union has requested that he be paid the wage differential between the job of Stock Clerk and that of Tube Stitcher retroactive to the date he was denied the Tube Stitcher job.

"Even though the evidence strongly indicates that the employe will be able to perform the work of Tube Stitcher there is an element of doubt. Under these circumstances, it would be improper to require the payment of the differential.

"The employe shall be assigned to the job of Tube Stitcher but shall receive no monetary relief."

Canadian Asbestos

CANADIAN ASBESTOS SHIPMENTS for 1953 amounted to 911,226 tons, a decrease of 2 percent from the 1952 shipments of 929,339 tons. The 1953 shipments, valued at $86,052,895, dropped 3.6 percent from $89,254,913, the value of 1952 shipments.

25 THEW LORAINS ... for PENNSYLVANIA GLASS SAND CORP.

Why buy the same make shovel 25 times? Pennsylvania Glass Sand Corporation of Lewistown, Pa., can tell you because years ago they found out some things about Lorains that convinced them they were a sound investment. They have used them under varying conditions in many quarries scattered throughout the country and they found one uniform characteristic regardless of the operation . . . *top performance at minimum cost* . . . an advantage they still enjoy today in their newest 2-yd. Lorain to an even greater degree due to Lorains' new, modern design and added operating advantages.

If you are interested in this size machine, let your Thew-Lorain Distributor tell you about the *design features* that make Lorain owners satisfied owners—again and again and again.

Learn how Lorain Center Drive can concentrate full engine power on one operation, or divide power so as many as 3 simultaneous operations can be handled at one time. See how smoothly, powerfully, the non-shock, non-stall Hydraulic Coupling Power Take-off applies power to the toughest digging. Metered air power controls, air dipper trip, new features for operator comfort and convenience are but a few of the advantages your Thew-Lorain Distributor can point out to you.

Lorain shovels, cranes, draglines, hoes and clamshells are available in many sizes up to the 2-yd. class. There is a wide selection of crawler sizes, plus rubber-tire Moto-Crane and Self-Propelled mountings to choose from. Call your Thew-Lorain Distributor. He has all the facts.

THEW LORAIN®

SHOVELS • CRANES • CLAMSHELLS
DRAGLINES • HOES

THE THEW SHOVEL CO., LORAIN, OHIO

GYROSET VIBRATING SCREENS FOR SIZING — DEWATERING

POSITIVE ECCENTRIC ACTION
POSITIVE STROKE ADJUSTMENT

WITH ONLY 2 BEARINGS

For scalping and for raw material sizing. A rugged two bearing positive eccentric screen. Adjustable as to stroke from 0 to 3/8" for efficient economical service.

PRODUCTIVE EQUIPMENT CORP.
2926-28 W. LAKE ST. CHICAGO 12, ILL.

Look at the load carried by these four NEFF & FRY Bins

All of the bridgework, with machinery, atop these bins is carried by the silos themselves without extra supports. What's more, the four bins, if filled, can hold about 3,000 tons of coal.

This strikingly proves the load-bearing strength of NEFF & FRY storage bins, which is due to the design and stamina of the Super-Concrete Staves in the walls.

Our bins are used in the industrial areas of North America for handling and storing a great variety of flowable bulk materials, the most frequent being alumina, cement, clay, coal, ore, lime, grain, sand, and wood chips.

The facts about NEFF & FRY bins are briefly told in our interesting folder, "Bins With the Strength of Pillars." A copy is yours for the asking without obligation.

THE NEFF & FRY CO. • 280 Elm St., • Camden, Ohio

Not exported except to Canada and Mexico.

SUPER-CONCRETE STAVE STORAGE BINS

Fine Grinding

(Continued from page 89)

ing right or left through a 6-in. pipe onto screw-controlled loading belts, which carry the limestone over Merrick Weightometers to a swivel loader. By this method a 50-ton box car can be loaded in about an equal number of minutes. The material is loaded in both ends, but not in the doorway, which is left free so that customers can easily get into the car with a Hough Payloader, which most of them use for unloading.

Push button control of the operation is in series so that a stoppage of one operation will also immediately stop the other operations on which it depends. For example, if something went wrong with the swivel loader the discharge from storage bins and the feeder belt would be automatically stopped. Likewise operation of the tunnel belt would cease if there were a stoppage of the rod mill.

From one of the storage bins, there is a loading belt conveyor which transfers to a short conveyor for bulk loading of trucks. Although most of the company's product is shipped by railroad, a considerable number of farm or ranch owners within a radius of 25 or 30 miles send trucks or spreaders for bulk loading; others take bagged material for hand loading into truck distributors. Two of the company's four Florida plants, those at Sarasota and Lebanon, produce dolomite. The other two, one at Kendrick and the new plant near Brooksville (the railroad station is Gay) produce high calcium limestone. Railroad shipments are made, according to the material wanted, from the plant having the lowest freight rate to destination.

Complete electrification of the mill involves a considerable number of motors totaling 370 hp., the largest, 200 hp., for the rod mill. The next largest, 50 hp., is for operation of the dust collector, which has an exhaust fan capacity of 17,000 c.f.m. A Hobart welding machine for machine repairs is operated by a 20-hp. motor. Other motors range from 2 to 10 hp.

Dolomite Products, Inc., owner and operator of this new plant, has been engaged in the crushed stone business in Florida, with headquarters in Ocala, since 1934. W. M. Palmer is president, S. D. Gooch is vice-president, and W. C. Parmeter is secretary-treasurer. Glenn T. Magill is superintendent of the Gay plant.

Opens Stone Quarry

RAID BROTHERS CONSTRUCTION CO., Denmark, Iowa, has opened a crushed stone quarry on the Ora Smith farm near Biggsville, Ill., producing agstone and road stone.

This Tough, Trouble-Free Belt Takes Heavy Loads In Stride

Here's an economical, tough belt for hauling heavy loads of coal, ores or aggregates in operations where long conveyor centers are necessary. Its troughability is good and its fastener holding is superb.

A sturdy, multiple-ply, rayon duck carcass makes this belt lighter and thinner than cotton-carcass belts of comparable strength. Skim coats between plies insure perfect bonding.

Like other heavy duty belts, these LOADLINER belts are custom made to meet particular requirements of individual jobs — unlimited length, widths to 72". They can be made with a cover tensile strength of 3500 to 4000 pounds average and a friction pull of 20 to 24 pounds; or with a cover tensile strength of 2500 to 3000 pounds and a friction pull of 16 to 19 pounds; also available in oil-resistant Neoprene. All are mildew inhibited throughout. A breaker strip can be included in top cover, if specified.

We also manufacture a complete line of industrial rubber products: belting, hose, packing and moulded rubber of every construction for every need. *Through your Quaker and Quaker Pioneer distributor* our research and engineering services are always available to help you solve any industrial rubber problem. *Write for name of nearest distributor.*

QUAKER RUBBER CORPORATION
Philadelphia 24, Pennsylvania

HKP

QUAKER PIONEER RUBBER MILLS
San Francisco 7, California

More Tonnage

"Cape Ann"
Forged
Steel Drop Ball

Ruggedly designed and drop tested to insure maximum breakage. Lifting link protected by deep recess to minimize cable replacement. Adaptable for swivel or shackle.

Used by leading quarries for *economical secondary breakage.*

2000 to 12000 lbs.

Prompt Shipments

For further information write—

Cape Ann Anchor & Forge Co.
Post Office Box 360
Gloucester, Mass.

MANUFACTURERS NEWS

Lippmann Engineering Works, Milwaukee, Wis., announces that George D. Becker, recently associated wtih Allis-Chalmers Mfg. Co. as product engineer in charge of crusher design, application and servicing, has joined its engineering staff as head of the department in engineering development. During his 36 years' experience in the field of development and manufacture of heavy machinery for the quarry and mining industries, Mr. Becker has been instrumental in developing designs and techniques that have become recognized in the crushing industry. Some of his achievements include the development of methods in the design of crushing chambers, plant flowsheets and a hydraulic support for gyratory crushing heads. He began his career with the Stedman Foundry & Machine Works in 1917 and five years later joined the crushing, cement and mining machinery division of Allis-Chalmers Mfg. Co.

George D. Becker

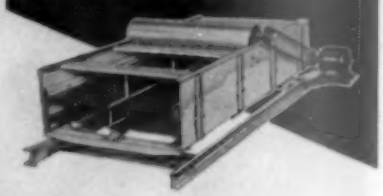
Baldwin-Lima-Hamilton Corp., New York, N. Y., announces that McClure Kelley, president of Austin-Western Co., a subsidiary, and general manager of the construction equipment division, has been promoted to executive vice-president of the parent company, of which he is a director; Oliver De G. Vanderbilt, III, former president of Taylor-Wharton Iron & Steel Co., has been elected a director and vice-president in charge of all commercial activities; Marvin W. Smith, president, has also been made chairman of the executive committee; Ralph K. Stiles, executive vice-president of Austin-Western Co. and a director of Baldwin-Lima-Hamilton, succeeds Mr. Kelley as president of Austin-Western; Henry F. Barnhart, vice-president of the Lima division and assistant general manager of the construction equipment division, succeeds Mr. Kelley as general manager of the latter division; Henry F. Lockhart, manager of the Rochelle plant of Austin-Western, has been promoted to director of sales for the construction equipment division.

Clark Equipment Co., Benton Harbor, Mich., has appointed the following distributors: C. N. Mason Co., Pensacola, Fla., in Florida west of the Apalachicola River including counties of Escambia, Santa Rosa, Okialoosa, Walton, Holmes, Jackson, Washington, Bay, Calhoun and Gulf; and Charles Dunn Machinery, Inc., Kansas City, Mo., in Missouri counties west of and including Mercer, Grundy, Livingston, Carroll, Saline, Pettis, Benton, Camden, Pulaski, Texas and Howell, and all counties in Kansas east of and including Washington, Clay, Geary, Morris, Lyon, Greenwood, Elk and Chautauqua.

Clark Equipment Co., Benton Harbor, Mich., has appointed the Midwest Equipment Co., Fargo and Bismarck, N. D., as distributor in all counties in North Dakota east of and including the counties of Rolette, Pierce, Wells, Stutsman, Logan and McIntosh, and Minnesota counties of Kittson, Marshall, Polk, Pennington, Red Lake, Norman, Clay and Wilken; also North Dakota counties west of and including Bottineau, McHenry, Sheridan, Kidder and Emmons, and Montana counties Valley, Daniels, Sheridan, Roosevelt and Richland.

Lith-I-Bar Co., Holland, Mich., announces the appointment of Paul Schwendeman, service engineer, as sales assistant to Ed Stielstra, west coast sales representative. Mr. Schwendeman was formerly production manager for the F. F. Kirchner Concrete Products Co., St. Louis, Mo. Herbert E. Glassford, field service engineer, has been promoted to sales assistant

UNIVERSAL
OFFERS THE BEST IN VIBRATING SCREENS AT THE LOWEST PRICE



Before you buy, be sure to get a copy of the new UNIVERSAL Catalog #1501

There's a model to fit your particular requirement, priced within the smallest budget.

Write today for free catalog #1501

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

You're Sure with Merrick

FOR Positive Controlled Feed by Weight of Sand Gravel, Lime Clinker, Gypsum or other materials to Process—

Use the Feedoweight

Merrick Scale Mfg. Co.
Passaic, New Jersey

MURPHY DIESEL POWER

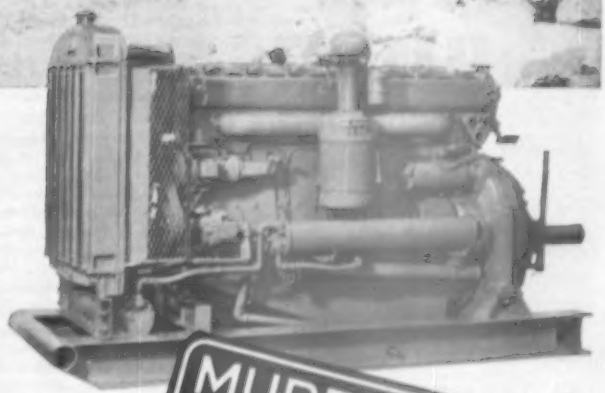
all the way on this job...

. . . turns out over 100 tons of limestone and flint rock per hour

● From this Kansas pit, W. O. Homer of Junction City, Kansas, is turning out 100 tons of limestone and flint per hour, with flint accounting for about 20% of the total. Mr. Homer is doing this job with a Murphy Diesel powered Northwest shovel and a Murphy Diesel powered Universal portable crushing plant. So it's Murphy Diesel all the way on this job.

If you're looking for dependable output at maximum operating economy, profit by the experience of pit and quarry operators everywhere, and put Murphy Diesel power to work for you. It's your best bet for getting the most rock per gallon of fuel and you'll particularly like the trouble-free service and freedom from costly downtime.

Talk over your requirements with your Murphy Diesel Dealer and ask him to show you what Murphy Diesel power can do for you.



MURPHY DIESEL

297

Heavy duty power

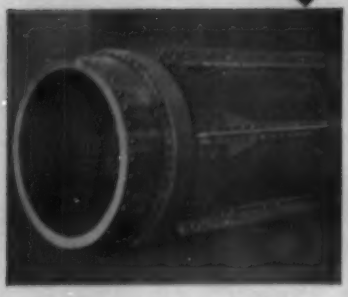
for rock crushing

Murphy Diesel Engines and Power Units are available in sizes from 90 to 240 H.P. Engine speeds are 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 154 K.W.

MURPHY DIESEL COMPANY
5315 W. Burnham Street
Milwaukee 14, Wisconsin
Sales, parts, service throughout the nation

for dredges
and washing plants

flat undercurrent and
round Trommel screens



made to your order by

YUBA

Accurately cut and drilled from U.S. Steel Abrasion Resisting plate to fit your exact job requirements. All thicknesses from 3/16". Other dimensions as big as your needs. Holes taper-drilled, unless straight sides requested. Hole sizes ¼" diameter or larger. Any hole spacing from one diameter or greater.

All YUBA screens are cut square to close limits and rolled true to insure proper fit and fast installation. Quick delivery from ARS plate in stock. Competitively priced. Sketches submitted for your approval on request.

For estimates and recommendations, wire, write or phone TODAY.

YUBA MANUFACTURING CO.
Room 717 • 351 California St. • San Francisco 4, Calif.

to Walter S. Giddings, northeastern representative. He was formerly superintendent of production and maintenance for the Sullivan Concrete Products Co., Ferndale, N. Y. Antonio Bersani, formerly general manager of production and maintenance for Quincy Cement Block Co., Quincy, Mass., has been appointed field service engineer, and Lloyd H. Nivison, field serviceman.

Butler Bin Co., Waukesha, Wis., announces that Morgan R. Butler, president, was recently awarded a Certificate of Distinction by New York University for his "professional achievements and services to the common good." A civil engineering graduate of New York University, Mr. Butler is widely known for his engineering achievements in precision equipment for materials handling, especially in relation to concrete construction of all types, including the recently announced electronic batcher which substitutes electronic card-controlled selection, proportioning, filling, weighing and discharge of aggregates and cement mixes by remote control.

Morgan R. Butler

Zonolite Co., Chicago, Ill., has transferred its central division headquarters from Little Rock, Ark., to St. Louis, Mo., following purchase of two licensee companies, Zonolite Insulation Co., St. Louis, and Vermiculite Products, Inc., Kansas City, Mo. C. R. Babb remains as central district manager, which consists of the sales territories of Missouri, southern Illinois and eastern Kansas in addition to Oklahoma, Arkansas, Louisiana and Tennessee, moving his headquarters from Little Rock. Gilbert Myrick replaces Mr. Babb as head of Little Rock plant operations in addition to his duties as sales representative in Arkansas and western Tennessee. Joseph E. Mitchell, representative in Nashville, Tenn., becomes manager of the Nashville plant in addition to sales representative in Nashville. Andrew Wise becomes Kansas City plant manager and will also be in charge of sales in the Kansas City area.

Dorr-Oliver, Inc., Stamford, Conn., has centralized headquarters of its sales divisions at Stamford, Conn., Chicago, Ill., and Oakland, Calif. Located at Stamford will be R. F. Clemens, manager of the eastern industrial division, Wilmington, Del., and T. T. Meehan, manager of the eastern filtration division, New York City. C. A. Knapp was recently appointed manager of the eastern sanitary division.

O. V. Lindell, manager of the central sanitary division, has moved from Evanston, Ill., to the Merchandise Mart in Chicago. Filtration sales will be handled by the central industrial division directed by R. A. Johnson. E. D. Flynn, acting western filtration division manager; W. T. Marston, western industrial division manager, Denver; and F. G. Nelson, in charge of the western sanitary division, Los Angeles, have moved their headquarters to Oakland, Calif.

Diamond Iron Works, division of Goodman Mfg. Co., Chicago, Ill., has announced the appointment of A. C. Quinn as district sales manager for Texas, Louisiana, Arkansas, Oklahoma, Colorado, New Mexico and Arizona, and N. H. Bogie as district sales manager for Delaware, Maryland, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Alabama, Georgia and Florida.

GMC Truck & Coach Div., General Motors Corp., Pontiac, Mich., has announced the following appointments: Julian M. Gilroy, assistant general sales manager of the eastern and southern regions; George W. Sheldon, assist-

"THIS LUBRICANT CUT BEARING REPLACEMENTS OVER 40%"

says—HANOVER BUILDING SUPPLY CO. of Hanover, Pa.

"Before using LUBRIPLATE, we replaced the wheel bearings in over 50% of our trucks each year. Since using it, bearing replacements have dropped to less than 10%. We have also been able to increase periods between chassis lubrications from 500 to 2000 miles. We are very happy over our change to LUBRIPLATE, and heartily recommend it to fleet operators interested in saving money."
HANOVER BUILDING SUPPLY CO.
C. O. Albright, Pres.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H.D.S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

National Slag Limited standardizes on Deister Screens in a new million-dollar plant

Lightweight plant at National Slag Ltd., showing (left to right) the crusher building and the finish screening building. Radial stackers lead to the fine and coarse slag stockpiles. Lightweight plant is equipped with Deister Type UHS 4 x 12 double-deck Vibrating Screen for scalping; two 4 x 12 double-deck UHS Screens for secondary; two 5 x 12 single-deck UHS Screens for final screening.

One of the most modern plants in the aggregates industry is operating along Queens Highway No. 20A, in eastern Hamilton, Ont., Canada. Owned by National Slag Ltd., the million-dollar dual-plant operation has a capacity of 90 t.p.h. of lightweight slag aggregates, and 150 t.p.h. of air-cooled or hard slag aggregates.

Vibrating screens, of course, play a critical role here in meeting National Slag's requirements for high-speed, low-cost sizing to rigid specifications. That's why, after careful study, they installed Deister Heavy-Duty Type UHS Vibrating Screens *all the way* . . . from scalping to finishing.

In selecting vibrating screens, National Slag Ltd.'s primary requirements were high capacity and peak efficiency in sizing. *The Deister Type UHS provides it through its exclusive opposed elliptical throw principle.* They wanted long, trouble-free operating life with minimum maintenance and downtime. *The Deister Type UHS features a life-time unitized vibrating mechanism, with two-bearing construction and oil-bath operation. And it features divided interchangeable screening sections, quickly changed or shifted to distribute normal wear and prolong life of screening medium.*

National Slag Ltd., like leading aggregates producers throughout the U. S. and Canada, know they can always depend on the Deister Machine Company for *advanced features...and personal interest by top management in the continued successful operation of every installation of Deister Vibrating Screens.*

Coarse (⅜" to ⅞") and fine (minus ⅞") expanded slag is sized at lightweight plant by this pair of Deister Type UHS single-deck 5 x12 Vibrating Screens.

Write today for complete information.

DEISTER

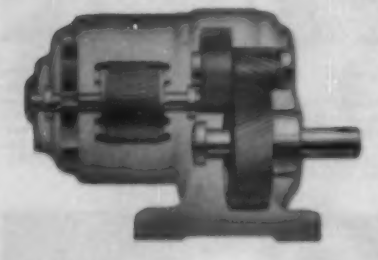
DEISTER MACHINE COMPANY

1933 EAST WAYNE STREET, FORT WAYNE 4, INDIANA

Tile Plant Increases Production 25%

Replacement of a worm gear drive on our Intensive Mixer with a Slo-Speed Electric Power Drive not only increased production 25% but also reduced power costs 58% and maintenance costs 75%, reports Mr. K. C. Sopp, Secretary-Treasurer of Pomona Tile Manufacturing Co., Pomona, Calif. Better machine performance has also had a very good influence on employee morale.

STERLING SLO-SPEED



OUTSTANDING FEATURES:

Simplified gear system — balanced design — compact — rugged — highly efficient — abundant lubrication — low output shaft — positive oil seals — Herringbone Rotor — protected — streamlined — direct through ventilation — quiet operation — AGMA speeds — extremely long life — every unit will operate in any position.

20-page illustrated catalog... Sterling Speed-Trol, Slo-Speed, Klosd and Klosd-Tite Electric Power Drives. Write for catalog No. 208.

STERLING ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santiago, Chile
Offices and distributors in all principal cities

and general sales manager of the central and western regions; Richard B. Gillespie, eastern regional manager; G. W. Blackburn, central regional manager; J. B. Clements, western regional manager; W. D. Gorman, New York zone manager; Robert A. Mern, St. Paul, Minn., zone manager; and Walter J. Carvey, Oakland, Calif., zone manager. Establishment of a Los Angeles zone office, to be headed by A. B. Campbell, Jr., has also been announced.

E. I. duPont de Nemours & Co., Wilmington, Del., has announced the appointment of Richard D. Hedreen as manager of the technical service section of the explosives department, succeeding the late Harold A. Lewis. Fred B. W. Hynes succeeds Mr. Hedreen as assistant manager of the Chicago office.

Borg-Warner Corp., Chicago, Ill., has announced formation of a new manufacturing subsidiary, Morse Chain of Canada, Ltd., which will occupy a plant to be built at Simcoe, Ont., Canada. The plant will be operated under the direction of S. J. Roush, president of Morse Chain Co., a subsidiary of Borg-Warner.

Hewitt-Robins, Inc., Stamford, Conn., has appointed Hamilton M. Ross as manager of operations of the conveyors division, and Harold E. Murton as manager of conveyor sales.

Rust Engineering Co., Pittsburgh, Penn., has announced the appointment of James A. Slater as sales engineer.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Lawrence E. MacDonald as general sales manager in charge of all domestic sales.

Thew Shovel Co., Lorain, Ohio, has purchased the controlling stock of Dixie Crane & Shovel Co., Inc., Harrisburg, Penn., and announces that Dixie cranes will continue to be manufactured and distributed by the company under the Dixie name.

H. K. Porter Co., Inc., New York, N. Y., announces that Herbert L. Waltman has been named manager of the Pacific Northwest district of the Lochoa wire rope division, which includes Washington, Oregon, western Idaho, Montana and North Dakota, with headquarters in Seattle.

Twin Disc Clutch Co., Racine, Wis., announces that R. C. McRoberts has been appointed assistant sales manager of the hydraulic division; J. E. Schubeler has been named manager of export sales, and E. H. Bennett has been made district manager of the Dallas, Texas, branch.

Dow Chemical Co., Midland, Mich., has opened a new field sales office in New Orleans, La., to serve Louisiana, southern half of Mississippi, southwestern Alabama and northwestern Florida.

Clark Equipment Co., Battle Creek, Mich., has announced the appointment of Joseph T. Bradshaw as western district sales manager for the industrial truck division, with headquarters in San Francisco, Calif.

Cummins Engine Co., Inc., Columbus, Ind., has announced the transfer of H. A. Strohman, assistant regional manager, eastern region, New York, to Harrisburg, Penn., as representative in Pennsylvania, Maryland, Delaware, southern New Jersey, western third of New York State, and a portion of northern Virginia.

Koppers Co., Inc., Pittsburgh, Penn., announces that Melvin S. Griffith, Jr., has been appointed industrial relations manager for the entire company. He was formerly industrial relations manager of the metal products division and succeeds Van H. Vlet who has resigned to become director of employe relations for the Crucible Steel Co. of America.

Koehring Co., Milwaukee, Wis., has appointed D. C. Kilpatrick as district representative in North and South Dakota, Montana, Nebras-

(Continued on page 195)

STEEL

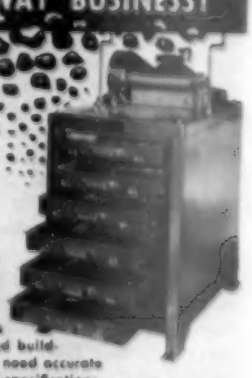
quick delivery

Ryerson

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

Ryerson Plants: New York, Boston, Philadelphia, Charlotte, N. C., Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco, Seattle, Spokane.

Get the **HIGHWAY BUSINESS!**



CONTROL your SIZING with GILSON

To get in on this year's record road building business you need accurate control of sizing specifications. The **GILSON** Mechanical Testing Screen cuts out error and guesswork in complying with sizing requirements for crushed stone, gravel, slag, coal, ores and similar materials — guarantees that every load is as ordered.

Write now for information

Here's why you want GILSON—

1. Makes tests quickly and accurately
2. Two to seven separations simultaneously
3. Screen trays independently removable
4. Trays balanced to same tare weight
5. Visible separation to refusal
6. Few moving parts
7. Sturdy construction
8. Size range 4" to 200 mesh

For Research Projects, too—the GILSON Screen is the answer to moderate-scale mass separation jobs.

GILSON SCREEN CO.
MALINTA, OHIO

MORE CYCLES PER DAY!

DART'S GREATER MANEUVERABILITY CAN CUT YOUR COSTS!

Look at this turning radius comparison:

22 Ton Truck "A"	Approx. 31'7"
20 Ton DART	Approx. 22'6"
Passenger Car	Approx. 22'6"

DART

TONNAGE ENGINEERED TRUCKS

Waste motion in truck haulage kills profits. Thanks to DART engineering, you can put a stop to waste motion.

The combination of DART'S box girder frame, longer two-stage springs, and shorter turning radius combined with higher horsepower engines enables quick spotting at the shovel in the tightest quarters. Added to this efficiently operating combination, a torque converter drive (which is optional) makes smoother, faster operation.

A stop-watch comparison will convince you...DART TRUCKS can deliver more loads per day, more profits for you.

There's a DART man NEAR YOU who will give you the complete data on DART TRUCKS. Give us a call or write:

DART TRUCKS
Kansas City 8, Missouri
SUBSIDIARY OF THE CARLISLE CORPORATION

3 MONEY-SAVING FEATURES:

15-SECOND DUMPING. Twin, single-stage, double-acting jacks raise the body to maximum dump position in just 15 seconds. Fully protected cylinders mean a clean, positive dump at all times under the most rugged conditions.

OPTIONAL TORQUE CONVERTER. The smooth-acting torque converter provides down-hill braking with compression. It means less brake, tire and road maintenance...assures faster starts; longer service life of transmission and engine.

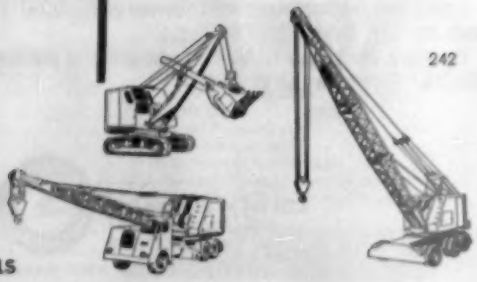
TWO-STAGE SPRINGS — save money by reducing shock to all component parts of the truck. They provide greater tire-to-road contact and cushion the wear. Tires last longer.

new 1½ yard BAY CITY . . . ideal for tough quarry work

In the quarry and on many other tough jobs, Bay City Shovels are proving their honest dependability day after day. For instance, below is a new model #70, working for the Essex Sand and Gravel Company at Peabody, Massachusetts. This low-weight, low-price #70, rugged enough for quarry work, will handle any excavating job. Powered by Cummins Diesel with hydraulic coupling, the #70 as a shovel weighs 44 tons and is equipped with 23 ft. boom, 18 ft. sticks, and a 1½ yard rock-type dipper. Let us tell you more about this fully convertible shovel-crane which is available with standard or long crawlers. BAY CITY SHOVELS, INC., Bay City, Michigan.

WRITE FOR CATALOG 70/700-A

This 16-page catalog is yours for the asking. It tells the story of the 70/700 in pictures and text. Write for your copy today—no obligation.



242

BAY CITY

BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

ka, Iowa, Minnesota, Kansas and western Missouri, in addition to Canadian provinces of Alberta, Saskatchewan and Manitoba. John E. Mahoney, Jr., has been named district representative in Alabama, Florida, Georgia, North and South Carolina, Virginia and West Virginia.

Joy Mfg. Co., Pittsburgh, Penn., announces the appointment of John D. Russell, formerly manager of engineering, as vice-president of engineering.

Mack Trucks, Inc., New York, N. Y., announces that P. O. Peterson, formerly executive vice-president of Studebaker-Packard Corp., has been elected president and chief executive of the company. He succeeds E. D. Bransome, who continues as chairman of the board.

International Harvester Co., Chicago, Ill., has appointed Howell Tractor & Equipment Co., Chicago, as distributor in northern Illinois and northwestern Indiana.

Marmon-Herrington Co., Inc., Indianapolis, Ind., has announced the appointment of Edward F. Ray as general sales manager of the all-wheel-drive truck division in the United States and other countries, in addition to supervising the service and parts departments.

Pratt-Daniel Corp., South Norwalk, Conn., announces the appointment of Richard F. Sharon as manager of the Thermobloc division. He was formerly chief engineer of the division.

Syntron Co., Homer City, Penn., has appointed William S. Stephens as application engineer for Syntron electric bin vibrators, "Vibra-Flow" vibratory feeders, grizzlies and screens. He was formerly district construction engineer for the Pennsylvania Department of Highways.

Thor Power Tool Co., Aurora, Ill., has appointed John B. Dempsey as manager of electric tool sales, with headquarters in Aurora. He was formerly Detroit branch manager and will be succeeded by Otto Shellenberger, who has been Detroit service engineer.

Worthington Corp., Harrison, N. J., has moved its Detroit district office to 15305 Puritan Ave., representing an expansion of nearly 100 percent over its existing facilities.

Pioneer Engineering Works, Inc., Minneapolis, Minn., announces the retirement of K. E. Brunsdale, first vice-president, after more than 25 years of service to the company he helped found in 1928. He has been first vice-president since 1951. Previously he was vice-president in charge of sales, secretary-treasurer, sales manager, advertising manager and credit manager.

Mexico Refractories Co., Mexico, Mo., announces establishment of warehouse facilities at 2431 East Marginal Way, Seattle, Wash., to serve the marine industry in the Seattle territory.

American Steel Dredge Co., Inc., Fort Wayne, Ind., announces that Walter W. Walb, president and general manager, has been elected president of the Power Crane and Shovel Association. He succeeds Julian Steelman, president of Koehring Co., Milwaukee, Wis. D. W. Lehti, president of Link-Belt Speeder Corp., Chicago, Ill., was elected vice-president of the association.

St. Regis Paper Co., New York, N. Y., announces the retirement of Carl H. Hartman as vice president in charge of multiwall bag development, and H. Stanley Hangen as vice-president of St. Regis Sales Corp., a subsidiary. Both men will continue to serve in a consulting capacity.

St. Regis Paper Co., New York, N. Y., has consolidated the mid-Atlantic district of the multiwall packaging division into the eastern district of the division, with Howard C. Peterson, Jr., vice-president of St. Regis Sales Corp., in charge.

THE MECKUM SAND AND GRAVEL JIG

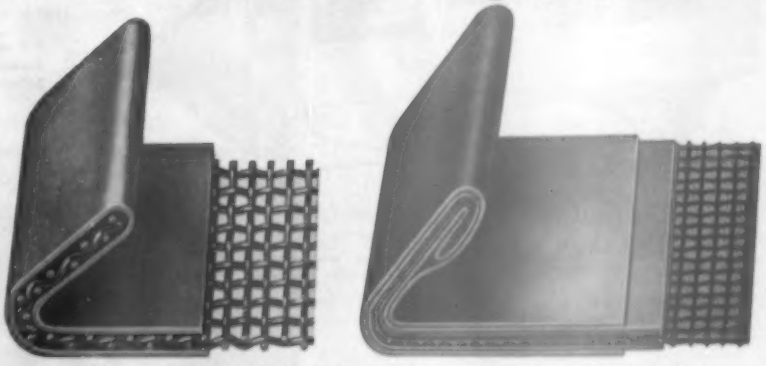
REMOVES
WOOD
LIGNITE
OCHRE
SHALE
POROUS STONE
SOFT STONE
COAL
CHERT
CLAY

Improve your sand or gravel specifications at a low cost per ton. Of compact design, the Meckum Jig separates low from high specific gravity materials with a positive water and mechanical action.

Write us for details or nearest installation.

MECKUM ENGINEERING, INC.
53 W. Jackson Blvd., Chicago 4, Ill. Dayton Road, Ottawa, Ill.

Tyler Screen Sections for All Makes of Screening Machines!



Screen sections of Tyler Woven Wire are fabricated for all makes of vibrating screens in any mesh or metal. They are made up with hook-strip or bent-edge construction to suit the machine on which they are to be used.

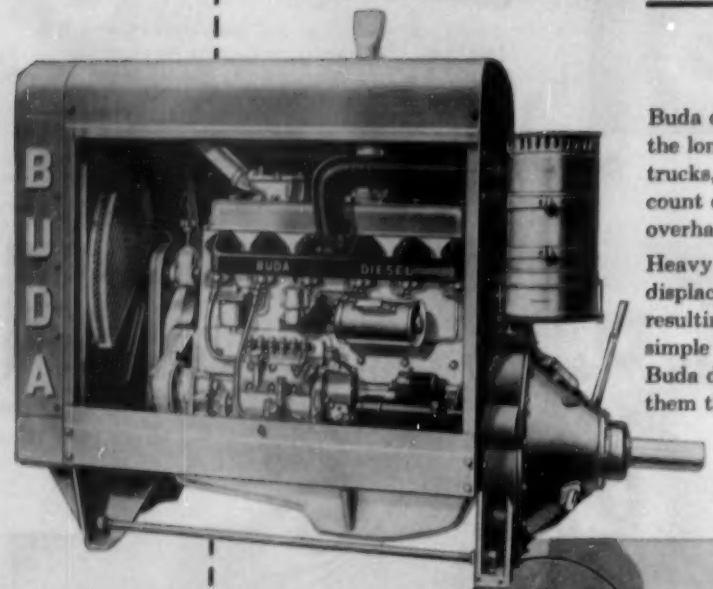
Tyler hook-strips make possible stretching and maintaining the screening at drum-head tension, which is essential for successful screening and long screen life.

THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

BUDA DIESELS

average 6000 hours

before overhaul in toughest service



Buda dyna-swirl Diesels are heavy duty built for the long run. Whether they power crushers, trucks, scrapers, shovels or dozers—you can count on an average 6000 or more hours before overhaul. This means money in your pocket.

Heavy duty construction . . . . 10 to 17% greater displacement . . . . controlled turbulence combustion resulting in lower peak pressures . . . . "clean" simple design with fewer parts are only a few Buda dyna-swirl Diesel advantages that make them the longest-life engines in the business.

Ask your nearby Buda Engine Distributor to prove Buda Diesel Superiority today. There's no obligation. Write for illustrated Bulletin and data. The Buda Co., Harvey, Illinois

Buda 844 Diesel engine powering Telsmith Crusher

9C-35

BUDA Division

ALLIS-CHALMERS MANUFACTURING COMPANY

Harvey, Illinois

Substantial savings are realized by cement mill operators using ABK Metal liners in primary, secondary or tertiary compartments for wet or dry grinding of raw stone or finished product.

Extended liner life of as high as 3 or 4 times can be expected when ABK Metal replaces ordinary iron liners. That's because of the extreme hardness (500 to 700 Brinell, as required) and very high resistance to abrasion that is characteristic of every ABK Metal casting. A nickel-chrome iron of controlled structure, ABK Metal is produced only by Brake Shoe.

Why let abrasion steal your operating dollars. Specify ABK Metal castings . . . cut your replacement, maintenance and downtime costs and increase your grinding mills' efficiency.

QUALITY CASTINGS IN | **ABK METAL** **ABSCO METAL**

1607

AMERICAN Brake Shoe COMPANY

Baltimore • Chicago • Houston • St. Louis • San Francisco • Superior • Toledo

BRAKE SHOE AND CASTINGS DIVISION

230 Park Avenue, New York 17, N. Y.

Choice of 304 different buckets for Rehandling, Wide Rehandling, General Purpose, Hard Digging or Dredging

Why such a big choice?

So you can have the bucket that will fit your job whether it's rehandling sand or large pieces of limestone.

So it will fit your crane whether it's a small truck-mounted type or a big crawler.

So it will fit your present cable.

All these add up to 304 different possible combinations.

To select the proper size, weight and type bucket for the most efficient and profitable operation of your crane usually requires the service of a competent distributor's or manufacturer's sales engineer.

See your nearest Blaw-Knox distributor today.

Send for BULLETIN 2254-R1

BLAW-KNOX COMPANY
CONSTRUCTION EQUIPMENT DIVISION
Pittsburgh 38, Pa.
Offices in Principal Cities

BLAW-KNOX

BLAW-KNOX CLAMSHELL BUCKETS

---

designers and builders of equipment for basic industries

M^C NALLY PITTSBURG

Roller Chain

ROLLER Chains of all types are built by McNally Pittsburg for any tonnage or service use, to provide trouble free operation.

To Basic Industries McNally Pittsburg Offers:

— SERVICES —
Research & Development
Engineering Design — Field Erection

— EQUIPMENT —

Roller Chain	Car Dumpers
Rotary Breakers	Car Hauls
Bucket Elevators	Conveyors
Pumps, Valves, Piping	Pug Mills
Dryers, centrifugal & heat	Crushers
Washers, automatic, heavy media & jig	Screens
	Kilns

— OFFICES —
First National Bank Bldg. Pittsburgh, Pennsylvania — 307 N. Michigan Chicago, Illinois

— PLANTS —
Pittsburg, Kansas — Wellston, Ohio

Redi-Flow Vibrating Feeder

for New Economy and High Capacity

The Barber-Greene Redi-Flow is a new, low-cost, lightweight vibrating feeder. Ingenious design eliminates expensive electrical-mechanical vibratory mechanism. Simple construction insures longer life, less maintenance.

Capacity ranges to 300 tons per hour—is easily regulated. Handles a very wide range of materials, with lumps up to 12" when mixed with fines. The Redi-Flow is completely self-cleaning. The leakproof feeder pan eliminates carry back. Shipped completely assembled. Easily attached to any hopper.

55-28-RF

See your B-G distributor or write

Barber-Greene
AURORA ILLINOIS U.S.A.

You'll Vote For

X KLEENSLOT
WEDGE WIRE SCREEN

Everytime

The ideal screen for dewatering, sizing and cleaning operations. They can be adapted to fit any make of vibrator. You do not have to change your present machine to accommodate KLEENSLOT screens. They are of quality construction and their rigidity and method of installation prevents "whipping."

Complete literature is available and will be promptly sent to you if you request it on your company's stationery.

Kleenslot

This trade mark shows the non-clogging, non-blinding principle.

Wedge-Wire
CORPORATION
GAS STREET AT NICKLE PLATE R. R., WELLINGTON, OHIO

HETHERINGTON & BERNER

DREDGING PUMPS

performance-proven on the toughest jobs

H&B
ESTABLISHED 1867

Hetherington & Berner sand and gravel pumps are available in two general types: *STANDARD*, (4", 6" and 8" sizes) with semi-steel parts, for ordinary working conditions and moderate heads; and *DREADNAUGHT*, (6", 8", 10", 12" and 15" sizes) with manganese steel parts, for heavy duty jobs with stringent head conditions.

Write for Bulletin DP-147.

HETHERINGTON & BERNER INC.
753 Kentucky Ave. Indianapolis 7, Indiana

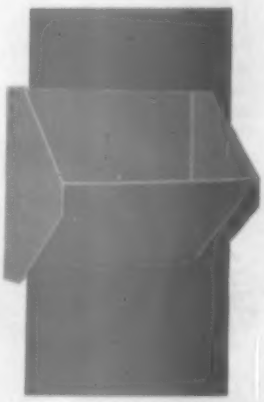
NOT QUITE FOREVER

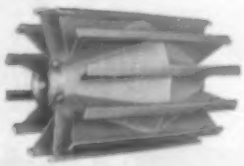
But Almost

THAT'S THE LIFETIME OF STANDARD ELEVATING AND CONVEYING EQUIPMENT

CONTINUOUS ELEVATOR BUCKET STYLE No. 2

Put this Standard Bucket to work handling the toughest materials, and it takes the job right in stride—resisting abrasion, corrosion and wear. This bucket is typical of the complete line of low cost, rugged Standard Steel Buckets — available in Salem, Style "A," shelf type and other continuous style buckets.



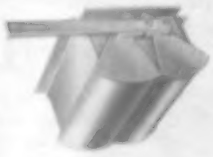


STANDARD WING TYPE SELF-CLEANING PULLEY

The most severe operating conditions won't bother this Standard Pulley because its all-steel welded construction gives it far greater strength and resistance to breaking. And yet it weighs less . . . costs less.

STANDARD BIN GATE

Profit from faster, easier material handling made possible by this gear-operated all-steel Standard Bin Gate. Other styles in Standard Bin Gates also available.



For lower maintenance and material handling costs, convert to Standard. Write today for catalog showing the complete Standard line.

The Standard Metal Mfg. Co. Since 1921

STANDARD METAL MFG. CO.
110 CENTER ST. MALINTA, OHIO

to low-cost bucket elevator service

HERE'S why Link-Belt Cast Buckets will pay off in longer life, better handling. These rugged buckets have uniform sections and smooth surfaces, thanks to special casting techniques. Their corners, lips, ends, and backs are reinforced for maximum rigidity.

Get all the facts on Link-Belt's broad line of cast buckets for both belt and chain. Book 2465 gives full ordering information. All styles are available in malleable iron or Promal and can be made of aluminum or bronze. See your nearest Link-Belt office or distributor.

LINK-BELT

CAST ELEVATOR BUCKETS

13.380

CLIP THIS COUPON AND MAIL TODAY

LINK-BELT COMPANY
220 S. Belmont Ave., Indianapolis 6, Ind.
(Or Your Nearest Link-Belt Office)

Please send me immediately a copy of Book 2465, "Link-Belt Cast Elevator Buckets."

Name_____
Position_____
Firm_____
Address_____
City_____ Zo__ State_____

BIN-FLO AERATING UNIT

Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.

BIN-DICATOR BIN LEVEL INDICATOR

For All Bulk Materials

signals change in level; automatically starts and stops filling and emptying equipment.

THE BIN-DICATOR CO.
13946-P Kercheval • Detroit 15, Mich.

NEW DETAIL DATA BOOK FREE

GAYCO CENTRIFUGAL SEPARATORS

GAYCO BRINGS YOU All These!

- Range 60 to 400 mesh
- Greater Capacity
- 25 to 30% greater production
- Cleaner Tailings
- Uniform Products
- Slow speed for slow wear
- Quick and easy adjustments

"TIMKEN BEARING EQUIPPED"

If you have an exceptionally hard separating problem,

TRY THE GAYCO.

Closer separations are possible with the Exclusive Gayco Centrifugal sizing fan. Higher production results from a more complete removal of the fines made by the mill. The efficient Gayco sizing eliminates all undesirable oversize from the product.

UNIVERSAL ROAD MACHINERY CO.
Robert M. Gay-Division
Factory and Laboratory, Kingston, N. Y.
117 LIBERTY STREET NEW YORK 6, N. Y.
Canadian Representative: F. H. Hopkins & Co., Ltd.
8500 Decarie Blvd., Montreal, Que.

Hundreds of Welders Step-Up Production with

TWO-TONE MANGA-TONE

using new, fast, easy techniques

Two-Tone welding is not difficult for any good welder of experience. He will be amazed at the ease of depositing enormous amounts of metal, by following certain little changes of technique.

In the same time it would take the average good welder to lay down about five pounds of coated or bare nickel-manganese electrodes of the conventional type, he can deposit at least 12 pounds of Two-Tone Manga-Tone. With practice he can increase this to 15 pounds on perfectly flat welding.

Nothing can be more tiring to the expert welder than to sit by the hour pouring on conventional type ¼ inch electrodes and getting nowhere. Of course the job of rebuilding a manganese casting with an inch thickness of weld metal is not easy, but hundreds of welders now using the Two-Tone process will testify that it simplifies the job and speeds up production.

The photograph shows the correct position for the two rods. Call in our Field Man and let him show you the Two-Tone techniques that will save you hours of hard, hot work. There are a few different movements in the manipulation of the arc that can make a world of difference on heavy, hot welding jobs.

RESISTO-LOY CO., INC., Grand Rapids 7, Michigan

If you want the SHARPEST SPLITS . . .
the BULGE in the MIDDLE removed . . .
RECOVERY of WASTED FINES . . .

If one or all of these is your problem, the Charles E. Wood Company's Consulting Service is available to you, whether the job is small or large. Let us show you how to solve your gradation problems economically, as other plants are doing it all over the country. Write for our bulletin today!

CHARLES E. WOOD COMPANY
906 NORTH WATER ST. • MILWAUKEE 2, WISCONSIN

ROCK PRODUCTS

THE
RECOGNIZED AUTHORITY
OF THE
NON-METALLIC
MINERALS INDUSTRY

STOP FUEL WASTE!

Rising costs of production and shrinkage of profit margin emphasize the continued need for economy at every possible point. You can save fuel and improve kiln operation by providing your Burner with a continuous record of oxygen, carbon dioxide, and combustibles in the flue gas. A continuous record of oxygen permits complete control of the air supply; combustibles analysis indicates oxygen demand under all conditions; the carbon dioxide record reflects the state of the calcining process. Diligent use of the Cambridge Gas Analyzer results in lower fuel consumption, more uniform product and dollars saved!

Records the whole story continuously on a single chart.

Send for literature

Cambridge Instrument Co., Inc., 3765 Grand Central Terminal, New York 17, N. Y.

CAMBRIDGE GAS ANALYZERS
PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

ERIE STRAYER TRUCK MIXER PLANT DELIVERS FOR LIMESTONE READY MIX OF NASHVILLE, TENN.

Faster Operation • Higher Output • Better Profit

The CTES, 160-YD Erie Strayer Truck Mixer plant installed by Limestone Ready Mix Co. One-man operation with faster batching and higher output increased their profits—earned a repeat order for distributor, Industrial Tractor and Equipment Co., Nashville.

SLOW SERVICE to suburban users, and long, dead hauls posed a problem for Limestone Ready Mix Co., Nashville, Tenn. They licked it with an Erie Strayer Truck Mixer Plant, installed at Madison—seven miles from downtown Nashville.

Six months later, T. C. Petty, general manager has this to say: "Our Erie Strayer has more than filled the bill. Now we can make fast deliveries of specification concrete—our customers are pleased!"

Mr. Petty names these Erie Strayer features as the reason for this satisfactory, fast service:

1. **Easy, economical erection.**
2. **Bins and batching equipment of quality materials and efficient design.**
3. **Accessible, workable controls.**
4. **Easy filling of bin compartments—maximum protection from contamination for other aggregates.**
5. **Free flow of materials from bins and batcher. Vibrator needed only on cement.**
6. **High output capacity.**

NEW ORDER UNDER WAY

Now Limestone Ready Mix is replacing their central plant in Nashville. James T. Wall, president, has specified an Erie Strayer Big Batch Plant. Like the Erie Portable, the Erie Big Batch Plant is soundly engineered. Both plants have the same fine features—only the size is different.

For literature, write Dept. P-45
Cable Address: EXIMPORT

ERIE STRAYER COMPANY

445 GEIST RD. ERIE, PENNSYLVANIA

CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

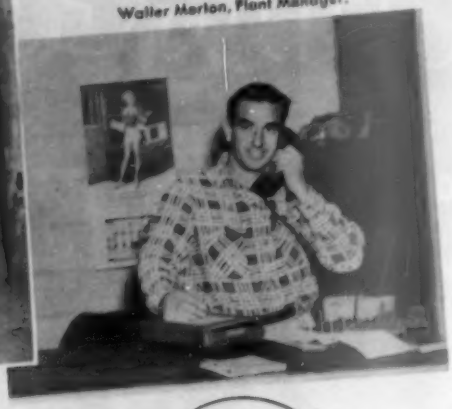
CONCRETE UNITS · READY-MIXED CONCRETE

Ready-mixed concrete and block plant of Wentzville Concrete, Inc., Wentzville, Mo.

Columbia...

Columbia Model 8 block machine in action at Morton's Building Materials Co., Lawrence, Kan. Note one-man operation.

Walter Morton, Plant Manager.



Morton's
Building Materials Company
Lawrence, Kansas

Columbia Machine Works
107 South Grand Avenue
Vancouver, Washington

Gentlemen:

We are so pleased with our new block machine that we feel obligated to write this letter.

We called on users of many makes of machines and decided on Columbia, when we found so many satisfied users.

This equipment due to its intense vibration under pressure produces high quality masonry units that have been enthusiastically accepted by architects and builders in this area.

During the installation of our machine, and since, the assistance and technical advice of your representative, E.J. Johnson, have been available and invaluable.

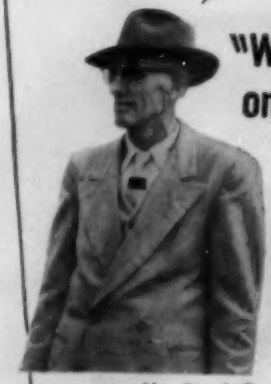
We readily recommend this machine, not only for its quality production, but because we have found that it will exceed its rated capacity and maintain that high quality.

Yours truly,

Morton Building Materials Co.

Clark O. Morton

Clark O. Morton



"We decided on Columbia ...when we found so many satisfied owners."

says Mr. Clark O. Morton
President

Mr. Morton had good reason to buy Columbia...and he's got good reason to praise Columbia now that he's had experience with Columbia's performance!

Columbia's automatic features, electronic controls and exceptionally thorough agitation lead Mr. Morton to conclude:

"We readily recommend this machine...because we have found it will exceed its rated capacity and maintain that high quality."

Columbia manufactures the 12"-High combination tile and block machine, Model 12 3-block machine, Model 8 2-block machine, block splitters, batch mixers and other equipment for complete concrete products plants.

Nationwide sales and service . . . parts available overnight in every locality in the United States! Write, wire or phone today for catalog and complete information.

District Offices in: Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, California and Massachusetts.

Columbia MACHINE
Home Office: 107 S. GRAND, VANCOUVER, WASHINGTON
Factory Branch and Warehouse at Mukwanago, Wisconsin

INDUSTRY NEWS

Cover Picture

ON THIS MONTH'S CONCRETE PRODUCTS COVER is an illustration of the efficient plant of Wentzville Concrete, Inc., located on the outskirts of Wentzville, Mo. The offices are in the corrugated steel structure, to the right, with the block plant and storage facilities, to the left, and the ready-mixed concrete batching plant between the two buildings. This plant set-up was designed for maximum efficiency in the employment labor and equipment. Aggregates are brought in by truck, above, so that movement of materials is largely by gravity and in a straight line production for both ready-mixed concrete and block production.

Expands Operations

GULF MATERIALS CO., Corpus Christi, Texas, has begun operations at a ready-mixed concrete plant at Victoria, Texas, with six 4½-cu. yd. mixers and a capacity of 100 cu. yd. per hr. The company has also purchased the Whitten Concrete Co. ready-mixed concrete plant at Bishop, Texas, making a total of four plants, the other located at Odem, Texas. Two-way radio communication was installed at the Corpus Christi and Odem plants last year.

Prestressed Concrete Meeting

THE PRESTRESSED CONCRETE INSTITUTE will hold its first annual meeting April 21 and 22, at the Lagamar Hotel, Fort Lauderdale, Fla. The program will include a round table discussion of manufacturing problems, talks by authorities in the prestressed concrete industry, and a field trip to the pretensioning plant of R. H. Wright & Son at Pompano Beach, Fla.

Sells Part of Business

OHIO VALLEY CO., Tell City, Ind., has sold its crushing plant, sand, gravel and ready-mixed concrete business to Mulzer Brothers, Tell City, and River Sand and Gravel Co., Owensboro, Ky. Ohio Valley Co.'s quarry and crushing plant is located near Cloverport, Ky. Mulzer Brothers has quarries and crushing plants at Derby and Eckerty, Ind. Ohio Valley Co., according to Hubert R. Bruce, owner, is retiring from the aggregate and ready-mix business to concentrate its activities on concrete block and other building materials, while the Mulzer Brothers firm reportedly is retiring from the concrete block and building material business to concentrate its activities in the crushed stone, sand, gravel and ready-mixed concrete business.

Marietta Acquisition

THE MARIETTA CONCRETE CORP., Marietta, Ohio, has acquired Conroe Concretes of Jamestown, N. Y., as part of its expansion and decentralization program. Frank L. Christy, Marietta president, expects the new plant to add an estimated $1,000,000 to the corporation's annual gross. The plant will be used primarily to produce concrete products for the St. Lawrence Seaway area.

Recent photograph of Florida chapter, Prestressed Concrete Institute, taken during January meeting at Lakeland. Front row, left to right: Rex Hartup, Food Machinery Corp.; Beverly Howard, Gordon Bros. Concrete Co.; Bill Noonan, Noonan Construction Co.; Paul Zia, Lakeland Engineering Assoc. Inc.; Mac Taylor, R. H. Wright & Son; Francis Pipkin, Gordon Bros. Concrete Co.; Tom Rose, Holloway Concrete Products Co.; Henry A. Edwards, Lakeland Engineering Assoc., Inc.; and Roy N. Hill, Lakeland Engineering Assoc., Inc. Back row, left to right: Roy Chastain, Lakeland Engineering Assoc., Inc.; Ray Chiodo, Duracrete, Inc.; Donald McCall, Basalt Rock, Napa, Calif.; Coach Nash Higgins; Sam Johnson, West Coast Shell Corp.; Eric Winch, Florida Prestressed Concrete Co., Inc.; Felix Losson, Lakeland Engineering Assoc., Inc.; Ashton Gray, Duracrete, Inc.; George Ford, R. H. Wright & Son; John Healt, J. A. Roebling's Sons Corp.; Leo Ryan, Ryan Industries Ltd., Windsor, Ont., Canada; and Harold Price, Basalt Rock, Napa, Calif.

PIGOTT CONSTRUCTION CO., Hamilton, Ontario, Canada, is consolidating its portable concrete batching operations and is building a plant on the waterfront, which will serve as a permanent base for its construction projects. The firm has leased 200 ft. on the Terminal Dock to facilitate shipment of sand, gravel and concrete by boat to the plant.

GRAYSTONE CONCRETE PRODUCTS CO., Seattle, Wash., has purchased Lakeside Gravel Co.'s mortar plant at Lakeside, Wash. The plant has been moved to a site adjoining Graystone's concrete products plant, and is being expanded and modernized. Carl Anderson, who formerly operated the plant for Lakeside, continues in the same capacity for Graystone.

SCHUSTER COAL CO.'S concrete products plant at Indianapolis, Ind., was swept by fire, causing damage estimated at $250,000. About $100,000 worth of concrete block machinery was destroyed, as well as five lift trucks and a dump truck. The fire is thought to have started from a small electric heater in an office.

WILSON AND SON'S ROCK QUARRY, Florence, Kan., was purchased by Walter Keeler, who also owns a ready-mixed concrete company in Wichita, Kan. The quarry, formerly owned by H. L. Wilson, will supply aggregate for the Wichita ready-mixed concrete plant.

HAROLD'S CONCRETE SUPPLIES, Elk City, Okla., has added a new division for the production of pumice, haydite and concrete block.

LINVER STONE CO. has established a cast stone plant at East Palestine, Ohio. The company also has plants near Youngstown, Ohio and at Des Moines, Iowa. Howard C. Linserbigler and F. L. Culver are officials of the firm.

CINDERLITE CORP., La Mesa, Calif., is utilizing scoria or lava ash as an aggregate in the manufacture of cinder building block. The ash is collected by the Tezonite Arenas Co. of Ensenada, Calif., from eight extinct volcanoes in the San Quentin Bay area.

THE KASSON CEMENT PRODUCTS COMPANY has started operations at its pre-cast concrete step plant at Kasson, Minn. Plant manager is Victor Anderson.

WESTERN CONCRETE & EQUIPMENT CO., Los Angeles, Calif., has built a ready-mixed concrete plant at Westminster, Calif. Plant facilities include a 200-ft. inclined conveyor belt.

HILLTOP BUILDING MATERIALS, INC., has opened its general offices at Lane Avenue off Selim, in Cincinnati, Ohio.

You get ALL this with a..

TRI-MATIC

power—

10 H. P. High-Torque Contra-Rotating Vibrator Motors with increased amplitude of vibration.

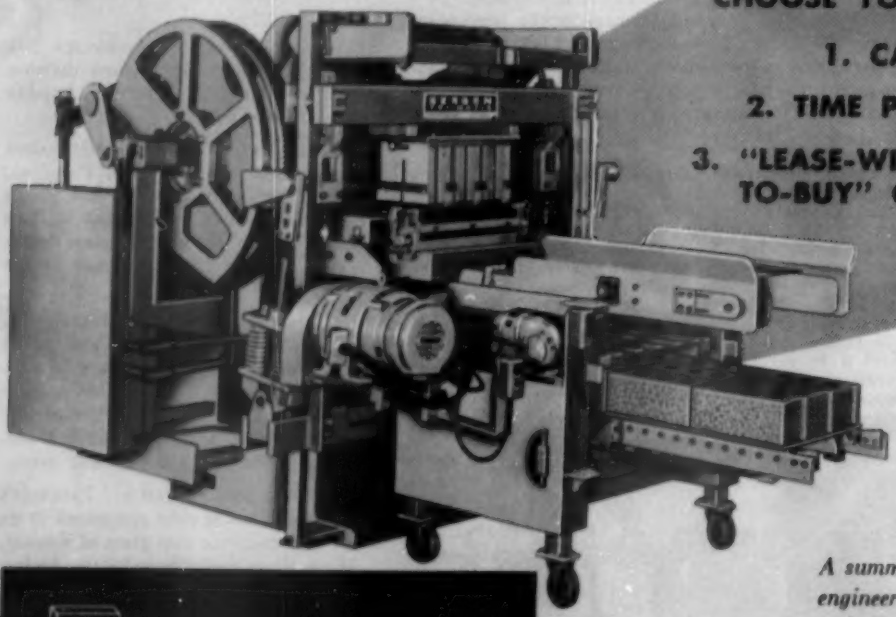
10 H. P. Main Drive Motor.

ruggedness—

Built on a 1½" thick Steel Frame with Heavy-duty Steel Shafts throughout.

production—

Over 1,000—8" equivalent block per hour, with suitable aggregates, without sacrificing strength or quality.



CHOOSE YOUR TERMS:—

1. **CASH**
2. **TIME PAYMENTS**
3. **"LEASE-WITH-OPTION-TO-BUY" CONTRACT**

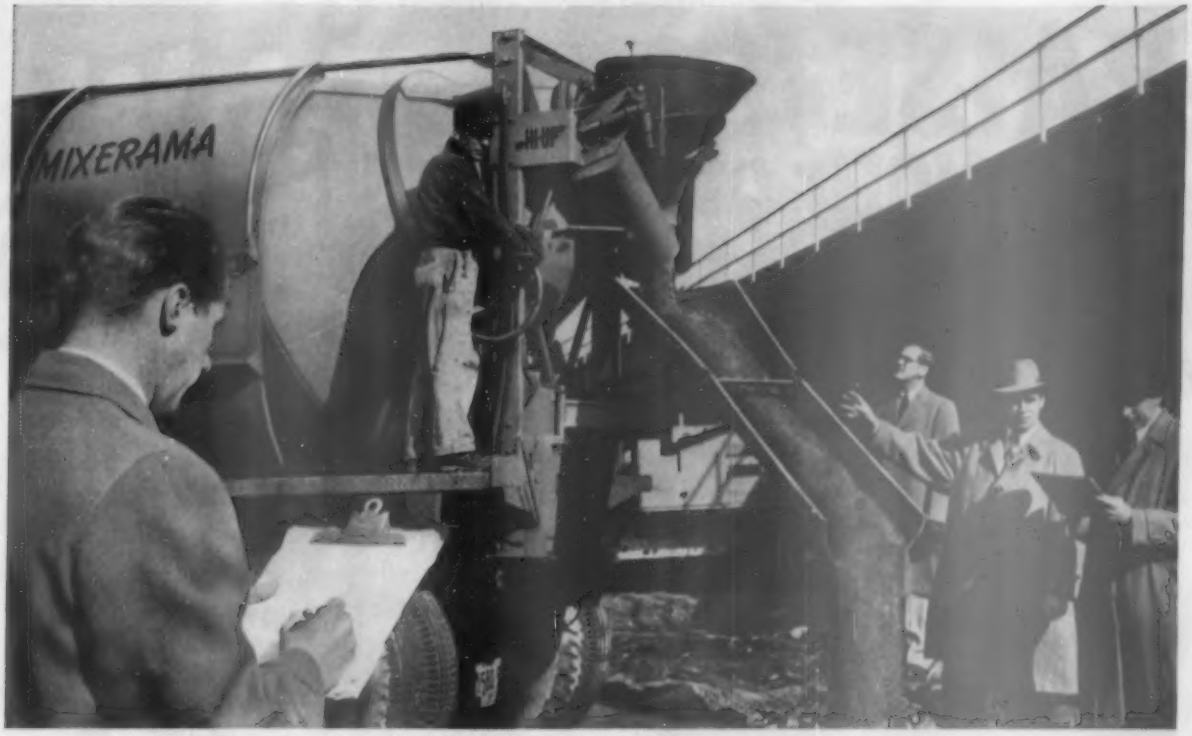
Did you get your copy of our new book, "Better Equipment"?

A summary of the most recent engineering advances in equipment and machine parts.

BERGEN
MACHINE & TOOL CO., INC.

NUTLEY, NEW JERSEY

Cable Address: "BERGENCO" (Nutley, N. J.)



Don't buy any other truck mixer till you've seen

Worthington MIXERAMA!

"On-Your-Job" demonstration shows why Worthington's HI-UP Truck Mixer does a better job

We believe the best way to prove to you that no other truck mixer can match a Worthington Hi-Up is to let you watch one at work.

We call this down-to-earth demonstration Worthington MIXERAMA. You'll call it the real test of truck mixer performance. Worthington distributors across the country want you to be their guest at one of these fascinating shows.

What will you see?

- You'll see exactly how Worthington Hi-Up Truck Mixers are designed for maximum payload.
- You'll see how fast it discharges . . . even with low-slump concrete.
- You'll see a really *rugged* transmission — *specifically designed* for a truck mixer. Single-lever operation.

Be our guest — or we'll be yours

You can watch Worthington MIXERAMA in one of two ways:

1. You can tell your Worthington distributor you want to see a Hi-Up in action on your own stamping grounds — loading at your plant, delivering concrete to your customers. And make sure you pick a day when you've got a *tough* pouring job to do!
2. You may attend a MIXERAMA in your area. The distributor will tell you where and when.

Call your distributor now

Make arrangements today to see Worthington MIXERAMA — either working from your batching plant or from a Ready-Mix plant in your area. You'll be glad you did — almost as glad as you'll be when you can call one of these hardworking truck mixers your own. Worthington Corporation, Construction Equipment Division, Section R.5.1, Plainfield, N.J. R.5.1

MIXERAMA'S on the way to you!

WORTHINGTON

If it's a Concrete Job, It's a HI-UP *Job*

Rock Drills • Wagon Drills • Pavers • Concrete Mixers • Portable Pumps • Portable Compressors

RAISE your efficiency factor...

With A Concrete Plant Designed And Built By Fanning-Schuett

The efficiency factor built into your concrete plant practically determines the economy of its operation. Therefore, every concrete plant and all the equipment in it should be designed to achieve top efficiency and built rugged and sturdy enough to meet the exacting demands of long service life.

For just these reasons many of the nation's top concrete plants bear the Fanning-Schuett label.

WARNER COMPANY, Philadelphia, Pa. This battery of conical bins is part of a huge loading facility. Bins may be charged with a gantry crane or conveyor. Material is discharged through openings controlled by large gates to waiting trucks below.

WARNER COMPANY'S Central Mix Plant at 51st Street and Schuylkill River, Philadelphia, Pa. Comprised of 3 cu. yd. mixers, 4 aggregate bins and 2 cement bins. Materials are delivered to bins by 30" belt conveyor and the 2 storage bins for cement are served by a large capacity screw conveyor with a super capacity vertical bucket elevator. Another Fanning-Schuett installation.

FANNING-SCHUETT JOBS IN PROGRESS

For **WILLIAM NUMBERS,** Collingswood, N. J. Cement handling bins and machinery and 3-compartment aggregate bin for a batch plant at Fort Dix, N. J.

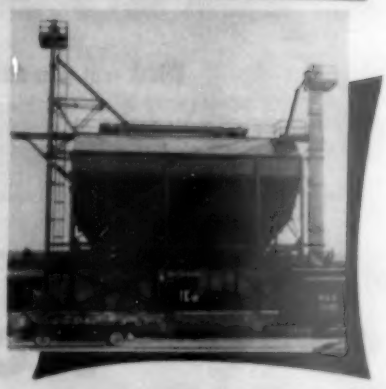
For **DELRAN CONCRETE CO.,** Riverside, N. J. Two large inclined belt conveyors.

For **BESCO CONCRETE PRODUCTS,** Deland, Florida. Additional cement handling equipment and batching plant.

For **DELAWARE VALLEY REDI-MIX CONCRETE CO.,** Hatboro, Penna. Cement storage bin and machinery for handling same. 4-compartment aggregate bin and batchers with large inclined belt conveyor for filling of same.

For **CORSON CONCRETE CO.,** Plymouth Meeting, Penna. New concrete plant with conveyor for filling of same. Separate batchers for aggregate and cement. Also, 2 cu. yd. Worthington Mixer for central mix.

For **AQUATITE TILE CO.,** Palmetto, Florida. Cement storage bin and machinery for handling same. 4-compartment aggregate bin with 3 cu. yd. batchers.



FORMIGLI BROTHERS, INC., Berlin, N. J. A concrete "products" plant. Principal items are roof slabs, floor slabs, concrete girders for highway bridges, etc. Design, fabrication and erection by Fanning-Schuett.

FANNING-SCHUETT ENGINEERING COMPANY
4325-39 NORTH THIRD STREET PHILADELPHIA-PENNSYLVANIA

WHITE MAGIC

...FOR CONCRETE PRODUCTS!

You can perform white magic in your concrete product! Use Medusa "the original" White Portland Cement for cast stone, concrete blocks, concrete brick and tile, curbing, ornamental concrete, fence and marking posts and many other products, and notice the amazing results. You'll be amazed at their white or colored beauty . . . a new clean look that sets your products apart from any competitors. That's because in all the world there is no whiteness like the diamond blue white of Medusa White. Concrete products manufacturers in every state have built successful business by taking full advantage of the magic of Medusa White . . . And for products whose beauty lasts indefinitely they use Medusa White *Waterproofed*. It sheds water and dirt . . . keeps concrete products free from dirt soiling for years to come.

Medusa White used in the manufacture of Cast Stone for the J. L. Long Junior High School, Dallas, Texas.

MEDUSA Portland Cement Company

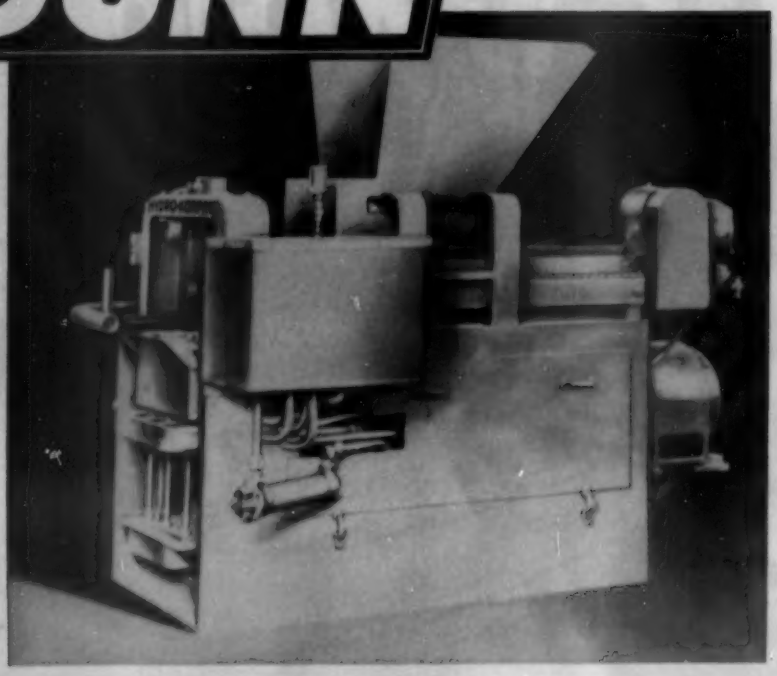
1000 Midland Building • Cleveland 15, Ohio

SALES OFFICES
Cleveland, Ohio
Chicago, Illinois — Toledo, Ohio
Pittsburgh, Pa. — New York, N. Y.
Milwaukee, Wisc. — York, Pennsylvania

WHITE • WATERPROOFED WHITE • GRAY
WATERPROOFED GRAY • AIR ENTRAINING • STONESET
HIGH EARLY STRENGTH • BRIKSET
WHITE TILE GROUT CEMENT

MAKERS OF AMERICA'S FINEST PORTLAND CEMENTS FOR OVER SIXTY YEARS

DUNN



HYDRO-KORPAK BLOCK MACHINE

Priced to fit modest budgets, the Hydro-Korpak brings the production economies and operating efficiency of advanced engineering within easy reach of average sized plants, or those with normal sales potentials. Its design is based on 50 years of block-machine building.

Two-way packing—vertical and lateral—results in blocks of extreme density and superfine quality. It's unique with Korpak, because only Korpak has oscillating cores.

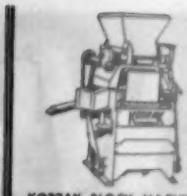
1-man operation . . . hydraulic movements . . . electrical controls. 2¼ tons of machine self-contained to occupy only 33 square feet of floor space. Available on sale or lease.

Direct-to-user selling through factory demonstration, with resultant savings passed along to owners. You are invited to Holland—as our guest—to see the machine in operation and get information first hand. Meanwhile, write for descriptive catalog.

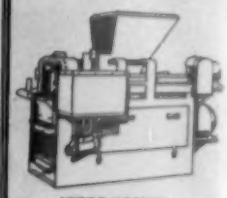
W. E. DUNN MFG. CO. • 544 W. 24th Street • HOLLAND, MICH.

IN CANADA: Dunn Masonry Machinery, Ltd., 996 Dundas Hiway, Cooksville, Ont.

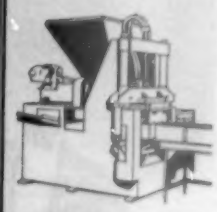
BUILDER OF CONCRETE PRODUCTS MACHINERY SINCE 1904



KORPAK BLOCK MACHINE



HYDRO-KORPAK BLOCK MACHINE

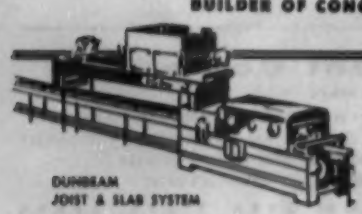


TWIN-PAK BLOCK MACHINE

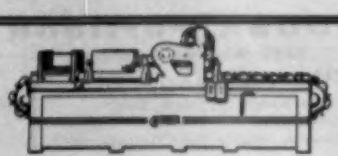
CHAMPION DRAIN TILE MACHINE

DUNN "AUTOMATIC" DRAIN TILE MACHINE

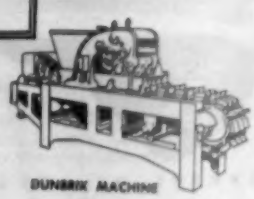
DUNTILE MACHINE



DUNBEAM JOIST & SLAB SYSTEM



CAVITEX MACHINE



DUNBRIK MACHINE

Send for this IMPORTANT BOOK

Possibly half the masonry-work currently being done in the U. S. utilizes concrete blocks.

Despite this wide usage, very little information has been issued on the type of *workmanship* required for good concrete-block construction.

The booklet shown above contains a full description of good block workmanship. It is completely illustrated. It is endorsed by leading officials of the American Institute of Architects, Mason Contractors Association of America, National Concrete Masonry Association, and the Bricklayers, Masons and Plasterers International Union of America. It should be in the hands of every architect, contractor and bricklayer. *Use the coupon today for getting your free copy.*

Published as an Industry Service

by the Manufacturers of

BRIXMENT for MORTAR

Louisville Cement Company — Dept. 14
Second and Walnut Streets, Louisville 2, Kentucky

Gentlemen:

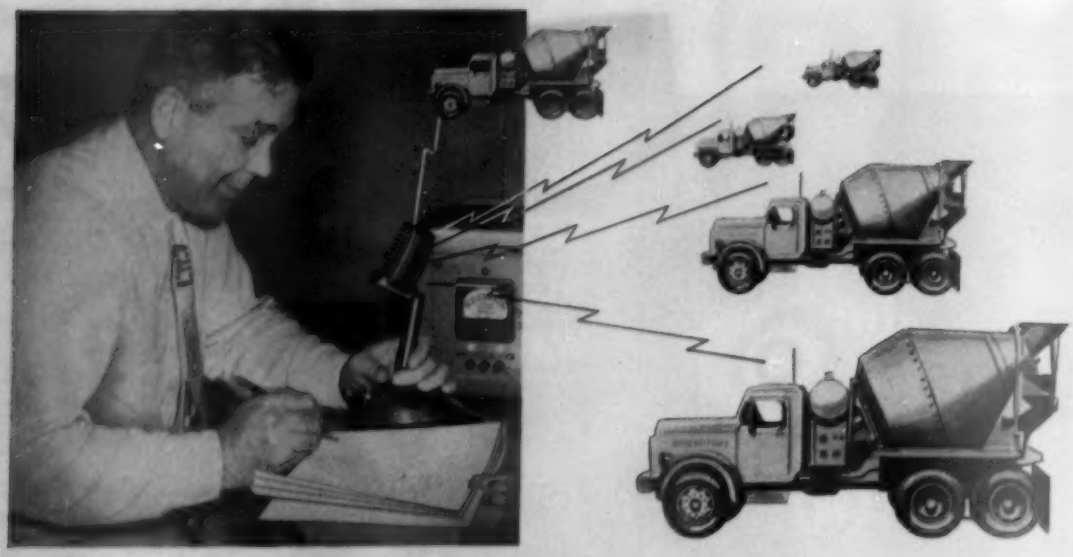
Please send me a free copy of "Type of Workmanship Recommended for Concrete Block Walls".

Name_____

Firm_____

Address_____

City_____ State_____



2-way radio **production** control

helps you pour **more** concrete with **fewer** trucks

Constant radio contact with every one of your trucks and service cars gives you *control* over your entire operation and more work and profits out of each truck.

By quarterbacking close plays right from his chair, your dispatcher can eliminate costly emergencies before they happen . . . can cut costs a dozen ways.

Motorola 2-way radio saves you $ 8 Dollars per day per truck, not only paying for itself, but earning extra profits for you from the *first day* it's installed. Write—wire—or phone, TODAY.

Motorola will furnish the equipment YOU need on the terms YOU want — cash purchase, installment plan, lease (with or without equity) . . . with optional installation and maintenance all included in a single contract.

Messages like these cut costs, make profits for you.

Dispatcher to truck 17 — "Customer just called from Johnson pour — forms not ready . . . skip it and double over to Becker job at 7th and Walnut — dump load there and report."

Truck 4 to dispatcher — "Niles School job needs just 8 more yards of mix to complete."

Dispatcher to Batching Plants — "8 more yards needed for Niles . . . then cut."

Truck 11 to dispatcher — "Got a flat 10 seconds ago . . . rush a spare out — 2 miles from town on Highway 17."

Dispatcher to truck 11 — "Truck on way . . . will be out in 8 minutes — don't worry."

Trucks are rerouted instantly by radio when necessary, or emergency help dispatched.

Driver lets dispatcher know when he arrives, job progress, when he'll be back.

Motorola
2-WAY RADIO

Motorola Communications & Electronics, Inc.
A SUBSIDIARY OF MOTOROLA, INC
4501 AUGUSTA BOULEVARD, CHICAGO 51, ILLINOIS
ROGERS MAJESTIC ELECTRONICS LTD TORONTO CANADA

Motorola consistently supplies more mobile radio than all others combined—
proof of acceptance, experience and quality.
The only COMPLETE radio communications service — specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance.
"The best costs you less — specify Motorola".

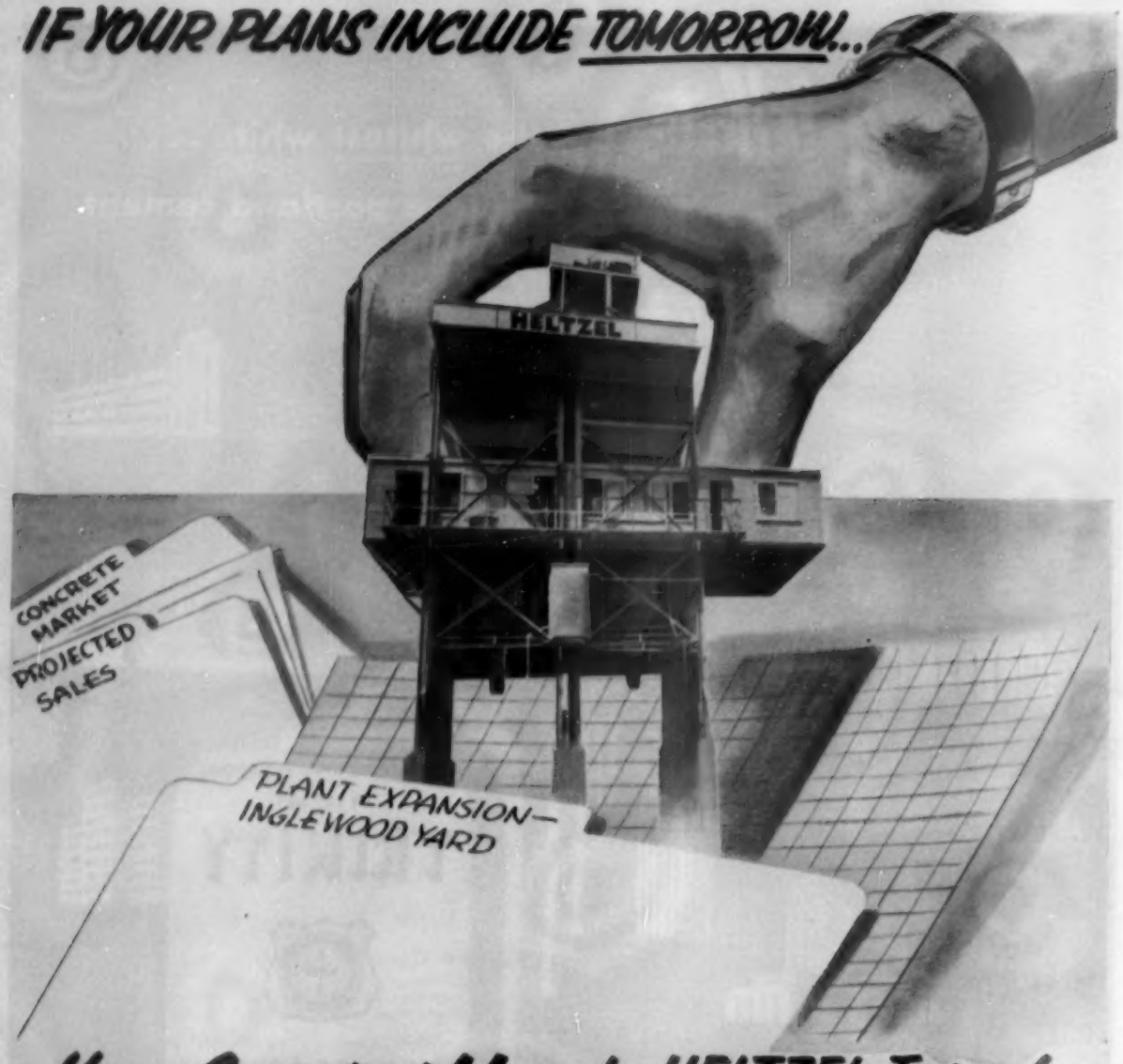
Trinity White ... the whitest white ... it is a true portland cement

USEFUL in almost every type of building, both inside and outside. As architectural concrete units or as stucco or cement paint, it emphasizes architectural perspective and detail. It has a high light-reflection which gives beauty and special utility to many interiors. ¶ Trinity White's extra whiteness gives truer colors where pigments are added. Widely used in terrazzo for its contrast-y white and better color effects in either simple or ornate designs. Meets all Federal and ASTM specifications. Ask for TRINITY White.

as white as snow

A Product of GENERAL PORTLAND CEMENT CO. • Chicago • Dallas • Chattanooga • Tampa • Los Angeles

IF YOUR PLANS INCLUDE TOMORROW...



... Your Smartest Move Is HELTZEL Today!

Designed to meet future requirements —engineered for speed, accuracy and low cost operation — built to give you years of "around the clock" service . . . three good reasons why it's smart business to think of HELTZEL when you're thinking of concrete batching equipment.

For when you purchase HELTZEL you're making a sound investment in the future. You are assured of the very finest quality, the last word in modern batching methods, backed by almost 50 years of batch plant manufacturing know how.

Compare HELTZEL in every way — see the new Heltzel Type 2 and Type 3 plants — talk with owners and you too, if you're thinking about tomorrow, will invest in HELTZEL today!

HELTZEL
BATCHING PLANTS

The HELTZEL STEEL FORM & IRON CO., WARREN, OHIO
20000 Thomas Road

....this year
we stepped-up to
the **CHALLENGE**
MEMBER N. R. M. C. A.
Pacemaker

There's no substitute in the feeling of pride that goes with Challenge ownership . . . pride in knowing you have the very best in truck mixer equipment . . . pride in knowing you are capable of offering unsurpassed performance on every job.

Challenge ownership not only builds up your morale, but with superior performance and service, the Challenge "Pacemaker" helps build your business too! Every satisfied customer is a good advertisement for your company, and a potential customer for future business.

If a new truck mixer is high on your list of plans for '55, your Challenge dealer will arrange for an "on-the-job" demonstration from your plant . . . at your convenience.

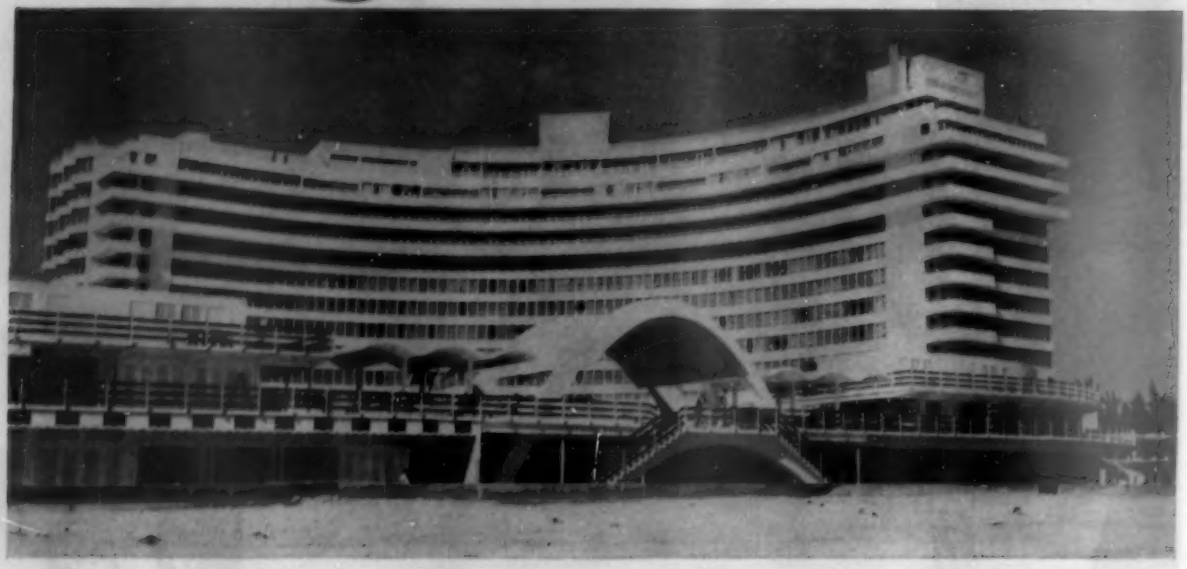
COOK BROS. TRUCK EQUIPMENT

COOK BROS.
EQUIPMENT COMPANY
3334 San Fernando Road, Los Angeles 65
Telephone: CLeveland 6-3151

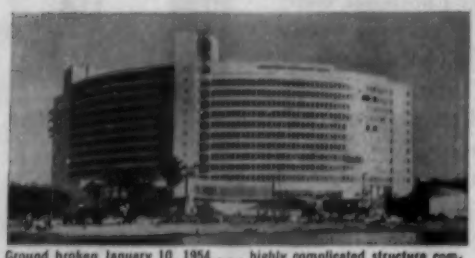
Rochester Distributors For CHALLENGE TRUCK MIXERS . . . Standard Of The Industry

the fabulous

Fontainebleau



Miami Beach's Magnificent New Hotel, Luxurious Place in the Sun, Concreted with 'Incor' for Economical Speed



Ground broken January 10, 1954 . . . highly complicated structure completed, hotel furnished, staffed and operating December 20, 1954 . . . Contractor says on-time completion would have been impossible without 'Incor' 24-Hour Cement

THE FONTAINEBLEAU
BEN NOVACK, President
Miami Beach, Florida

Consulting Engineers:
OBOLER & CLARKE, Miami Beach

Architect: MORRIS LAPIDUS
Miami Beach and New York

General Contractor:
TAYLOR CONSTRUCTION CO., Miami

Ready-Mix 'Incor' Concrete:
MAULE INDUSTRIES, INC., Miami Beach

● Magnificent new $14-million Fontainebleau Hotel, on the old Firestone ocean-front estate, 44th to 48th Streets, Miami Beach, opened its hospitable doors precisely on schedule last December.

Called with good reason America's largest and finest resort hotel, The Fontainebleau reflects in its every line and appointment a happy balance of hotel, architectural and construction imagination.

With concaved façade fronting on 950 ft. of private beach, the new 14-story hotel, air-conditioned throughout, has 565 bedrooms and suites, 263 cabanas, and private yacht anchorage.

'Incor' Speeds Completion

Construction is concrete throughout, for utmost stability and fire safety. On the basis of wide and successful experience, Taylor Construction Co., General Contractor, used 'INCOR' 24-HOUR CEMENT, 23,332 bbls., for dependable high early strength so essential in maintaining precise concreting schedules required for top construction speed at rock-bottom concreting cost.

Clock-like, pour-today-strip-tomorrow schedules saved $37,000. in extra forms that would have been needed for equal speed without 'Incor'. And the Contractor says this figure was dwarfed by time and labor economies due to smooth-running, assembly-line concreting schedules.

Match high-early strength economies with high ultimate strength and long-time durability and you see why 'Incor'* "belongs" on outstanding projects such as this.

*Reg. U.S. Pat. Off

LONE STAR CEMENTS COVER
THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

Offices: ABILENE, TEX. • ALBANY, N.Y. • BETHLEHEM, PA.
BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON
INDIANAPOLIS • KANSAS CITY, MO. • NEW ORLEANS • NEW YORK
NORFOLK • RICHMOND • WASHINGTON, D.C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 141,000,000 SACKS ANNUAL CAPACITY

Looking down at plant and part of the storage area showing precast, prestressed lightweight concrete structural members

Factory-Precast, Prestressed Lightweight Concrete Structural System

• Geo. Rackle & Sons Co., Houston, Texas plant produce all major structural members for industrial buildings. Girders cast with low-slump concrete have a 28-day strength of 7000 p.s.i.

By HUBERT C. PERSONS

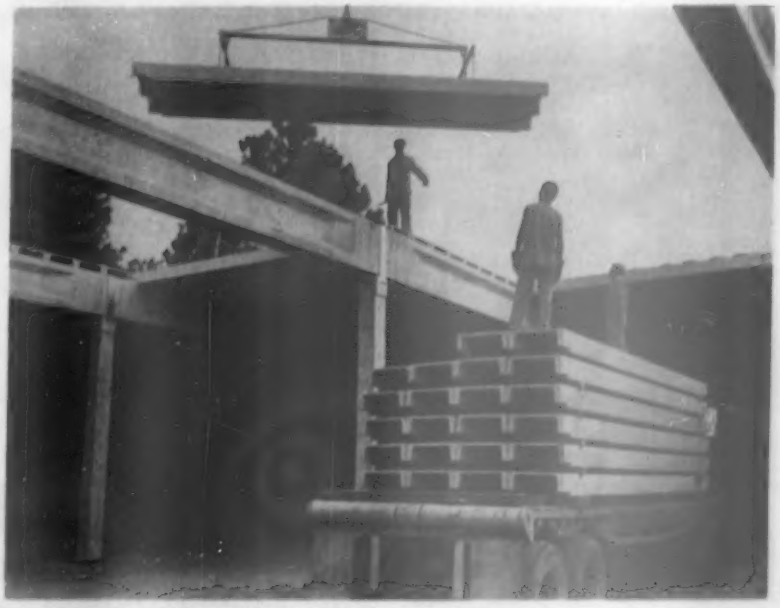
A FACTORY-PRECAST, PRESTRESSED LIGHTWEIGHT CONCRETE structural system is rapidly gaining acceptance in the Houston, Texas, area. Described by the manufacturers, The Geo. Rackle & Sons Co., as a "continuous-flow" method, the system has been consistently setting area-wide erection speed records for concrete construction.

A branch of an 85-year old Cleveland, Ohio firm of the same name, the Texas division was established in 1949. During its first four years of operation, the Houston plant confined itself to the manufacture of a wide range of precast lightweight concrete roof decking. Following research and experimentation in 1952 and early 1953, new structural units were designed in order to make available complete "packaged" industrial and commercial buildings precast at the factory. Production began in 1953.

The basic line includes such standardized units as "longspan" channel roof decking, prestressed girders, reinforced beams, interior columns, pilasters, and wall panels. Based on average maximum lengths of the two largest units of roof decking, modules have been established in bay areas of 20 x 40 ft. or 20 x 50 ft. (for 9-in. channels) and 30 x 40 ft. or 30 x 50 ft. (for 12-in. channels). In order to accommodate variations in customer specifications, and to arrive at lowest manufacturing costs, all units are cast in leakproof steel forms which are adjustable in at least one dimension.

Use Low Slump Mix

In addition to the firesafe and deterioration-free properties of all-concrete buildings precast by this method, the load-bearing structural units are engineered and manufactured to very high standards of strength and of moment resistance. Uniformity is assured by a rigidly-controlled low-slump mix which is centrally batched. Roof decking, columns, pilasters, reinforced beams, and wall panels are produced in a density of 100 lb. per cu. ft., with a 28-day cube strength of 4000 p.s.i., while the prestressed girders are manufactured at 110 lb. per cu. ft. with a 28-day strength of 7000 p.s.i. All units are made with Haydite expanded shale and clay lightweight aggregates (half fine, half course by volume), produced at Stafford and Eastland, Texas.



Roof decking is laid at 80 sq. ft. per lift

Pilaster being eased into place with crane and cable

A 30,000 sq. ft. warehouse in Houston, Texas constructed with factory-precast, prestressed structural system in 58½ hr.

Prestressed girders are post-tensioned, under a licensing agreement, by the Swiss BBR method. In the standard 40-ft. girder, three tensioning cables of ten ¼-in. 250,000-p.s.i. tensile wires per cable are tensioned to an initial prestress of 150,000 p.s.i., with a 20-percent factor to compensate for plastic flow and creep. In order to complete bond, the tensioning cables (which contain the tensile wires) are back-grouted under pressure with a very high-strength mortar.

Orderly Storage Area

The Rackle plant at Houston, designed and built in 1949 by The Austin Company, is laid out for the most efficient movement in the conversion of raw materials into finished product. Heavy emphasis is given to the orderly storage of units prior to delivery.

The "longspan," as well as smaller roof decking is manufactured in the central plant building, since this line represents the major volume of business. The central batching unit, a 25-cu. ft. Besser mobile mixer, is located in this building. Larger structural units are cast in adjacent open-air bays.

As individual items are manufactured, they are delivered to an 8-acre job-storage yard and are stacked in the proper sequence of erection in order to allow maximum speed of construction at the jobsite.

Efficient handling is essential to the "continuous-flow" system, and the Geo. Rackle & Sons Co. equipment reflects this policy. Heavy casting, stripping, storing, and loading operations are performed in a large outdoor crane bay — 50 ft. wide, 160 ft. long, and 30 ft. high — served by a 10-ton Lypta overhead traveling crane. Mobile operations are handled by a 10-ton Michigan truck crane with 40-ft. boom, a 5-ton Hyster crane, and five fork-lift trucks. Lighter lifting in the main plant building is performed by numerous Yale overhead traveling hoists (on a Louden track system) ranging in capacity from ¼-ton to 2 tons.

Erection Is Rapid

The erection of this "package" type building highlights the meaning of "continuous-flow." Within metropolitan Houston a complete structure, including walls, is put up at an average speed of 7500 sq. ft. of ground area per 8-hr. day. Framing with roof decking, but not including wall panels, averages 10,000 sq. ft. per day. Such jobs are normally handled by a motor crane with two-man crew, five to six ironworkers, and an erection superintendent.

By the end of 1954 a considerable number of these industrial and commercial buildings had been erected in the Greater Houston area — some as far as 60 miles away. Typical uses include a 64,000 sq. ft. manufacturing plant for the Kay Manufacturing Corp., a 30,000 sq. ft. wholesale grocery warehouse for Hubly & Co., a small paint shop for the Knapp Chevrolet dealership, a retail store, a 16,000 sq. ft. two-story tool and maintenance building for the Austin Co. at Freeport, Texas, and an anti-freeze canning plant for the Dow Chemical Co., also at Freeport.

Experience of Geo. Rackle & Sons Co. with the factory precast, prestressed concrete "continuous-flow" structural system bears out earlier estimates that the method provides permanent concrete structures "better, cheaper, and faster."

A precast wall panel being swung into place with a crane

• Short Course sponsored by Ohio Ready Mixed Concrete Association and held at the Ohio State University draws large attendance. Methods of producing high quality concrete and operating problems are main subjects

Members of panel on Operating Problems. Left to right: R. P. Mumford, Beckley & Myers Co., Springfield; Everett Beam, Clinton Construction Co., Wilmington; E. E. Osborn, Clinton Construction Co., Wilmington; Roger Slugg, Hamilton Gravel Co., Hamilton; A. F. Liggett, Hilltop Building Materials, Inc., Cincinnati; R. W. Ochsenhirt, Botzum Bros. Co., Akron; and James A. Nicholson, Nicholson Concrete Co., Toledo

Ready Mix Employes Go to School

CONCRETE SPECIFICATIONS of the future will include even the number of revolutions of the mixer drum, was among the predictions by speakers at the fourth annual Ready Mixed Concrete Short Course at Ohio State University in Columbus, February, 7 and 8. The course was sponsored jointly by the department of Civil Engineering of Ohio State University and the Ohio Ready Mixed Concrete Association. There were 220 registrations, mainly batchermen, central mixer operators, truck drivers, dispatchers, mechanics and other personnel.

In opening the first session in the Conference Theater of the Ohio Union Building on February 7, G. V. Lewis, engineer of the Anderson Concrete Co., Columbus, introduced eight officers from the Lockbourne Air Force Base, who were attending the course.

A Learning Activity

The fact that the Ready Mixed Concrete Short Course is "a learning activity," was emphasized by Harold A. Bolz, associate dean of the University's College of Engineering, in welcoming the concrete men.

"We are here to learn the why and how of producing a better product," Carl F. Shoaff, president of the Ohio Ready Mixed Concrete Association said in response to Dean Bolz' remarks. "We are not assembled here for a joy ride."

President Shoaff paid high tribute to the efficient work done by R. P. Mumford, chairman and other members of the Short Course Committee in making the short courses "both interesting and profitable."

The speaker stressed especially the fact that ready-mixed concrete producers are measuring up to their responsibilities. The production of uniform, high quality ready-mixed concrete is dependent upon good, properly graded aggregate and cement — plus — the sincere desire of management to produce high quality ready mixed concrete. There must be a willingness on the part of management to employ the necessary trained personnel to carefully and accurately blend these ingredients into a uniform, quality product.

Short Course Chairman Mumford outlined the scope of the study program briefly. He said the speakers assigned to handle various phases of the program were all authorities in their several fields. The water-cement ratio law would be emphasized, Mr. Mumford said, because of its importance. "Abuse of water," he declared, "is the greatest fault in the making of ready mixed concrete."

Discussions of "The Importance of Quality Concrete," from the separate viewpoints of an engineer and a contractor occupied most of the time of the first session. M. H. Walters, member of the Columbus engineering firm of Alden E. Stilson & Associates, opened the discussion with a presentation of the engineers' viewpoint.

Early in his remarks Mr. Walters raised the question as to whether ready-mixed concrete operators read an architect's or engineer's concrete specification before quoting on a job. "I frequently find that many of you do not do so," he said. Mr. Walters then related in considerable detail the difficulties which were encountered on one large concrete project as a result of failure to follow specifications.

The speaker then referred to the rapid growth of the ready mixed concrete industry which he said, "has grown to the point where even jobs like the Ohio Turnpike are supplied by firms like yours. Outside of the very large jobs, such as dams and paving operations, the contractors look to you for their concrete. You are doing a wonderful job and I sincerely compliment you on your contribution to the construction industry of today."

Mr. Walters introduced the subject of supervision of concrete from the standpoint of the architect's or engineer's inspector on the job. He quoted from a construction memorandum which his firm sends to the resident engineer at the beginning of every project. Mr. Walters said he is a firm believer in getting preliminary information before a concrete pour is made. "If the forms are not right, if the ready mix trucks cannot get into the job site, if the contractor is not set to handle the concrete as rapidly as he should be able to do in order to complete the pour, if the equipment such as cranes, buckets, chutes and vibrators are not adequate," then Mr. Walters said, "the pour is started and we are in trouble. Our best inspectors make sure that everything except 'acts of God' are taken care of before a concrete pour is started, because once the concrete starts rolling, it is too late."

Preliminary to a declaration that every ready-mixed concrete plant should have a concrete engineer, Mr. Walters said:

"Many of you pioneered ready-mixed concrete in your city or community. You have made ready-mixed concrete of such a quality and of such economy, that it is recognized as the best and cheapest concrete that can be obtained. However, I am afraid there may still be some of you who are only selling aggregate, cement and water, for a price. For such work as pavement, bridges, exposed concrete walls and so forth, there must be durability as well as strength."

Mr. Walters described a new concrete specification which he said the State Architect's Office has prepared as a guide to architects and engineers on state work. "It is basically a strength specification with aggregates meeting State Highway Department specifications," he said. "The mix design is left to the contractor with laboratory cylinders as the means of control. If the tests do not mean the specified strength, the burden of proof is on the contractor to load test or core the questionable parts of the structure. This specification will permit some of you to cut your cement content more than your competitors, depending on your ability to furnish uniform quality concrete. I imagine the responsibility is going to be yours because the general contractor is probably going to buy concrete from you on a guaranteed strength basis."

In concluding his talk Mr. Walters said: "I ask you, are your aggregates sound, well graded and uniformly graded? Can you deliver, on the job, uniform slump concrete from the first to the last of each truck, from the first to the last of the pour and from the first to the last of each job? If you can't, you still have a job to do."

Contractor's Viewpoint

The ready-mixed concrete industry should work out a time delivery system similar to the freight demurrage plan of railroads and steamship lines, Parker Garwick, contractor of Garwick & Ross, Columbus, told the meeting. He spoke on "The Importance of Ready Mixed Concrete from the Viewpoint of the Contractor." Mr. Garwick believes that the contractor who causes delays in deliveries because of his own loose organization should pay more than the average price for ready-mixed concrete. But he also advocates a credit in the form of a more favorable price for the efficient contractor who unloads equipment in less than the average time. Mr. Garwick said that contractor's costs on an average concrete pour on a sizeable job are not less than 66 cents per minute; delays are costly.

Mr. Garwick recommended having a ready-mixed concrete supervisor on every large project; urged increased cement storage facilities to avoid using "hot" cement and warned of the dangers of having a ready mix plant oversold.

Water-Cement Ratio—Mix Design

Clayton L. Davis, of New York, technical service director of the Universal Atlas Cement Co., and Stanton Walker, director of engineering of both the National Ready Mixed Concrete Association and the N.S.G.A., Washington, D. C. were prominent speakers on the program.

Mr. Davis' subject was "Water-Cement Ratio" which he said was a fetish with him. "Water in concrete is both a necessity and a villain," he said. "Portland cement must be mixed with water and aggregate in order to gain strength. We are dealing with a paste through which the aggregate must be distributed."

Mr. Davis described the phenomenon of hydration during which cement gel is formed. He explained that this gel was formed of very hard particles practically welded together. The gel, he said, contains varying amounts of crystaline particles and some unreacted or unhydrated cement. He said the gel forms in capillaries which originally contained water. The quality of the cement paste, he said, is determined by the quantity of mixing water.

Too much water, Mr. Davis showed with slide pictures and graphs, lowers the strength of concrete, makes it less watertight and increases shrinkage.

Mr. Davis urged the ready-mixed concrete operators to avoid the use of the word "pour" with reference to concrete construction, and said the term should be "place." He said the very word "pour" implied an overwet, soupy mix.

Mr. Walker said that "Design of Concrete Mixes," which was his subject is merely simple arithmetic. "Quality control," he said, "means batching ingredients of concrete accurately, and controlling mixing water. It means mixing concrete the correct length of time, and at the proper rate of speed." He said under-mixing results from too keen a consciousness of the cost of time. It must be remembered, he said, that a truck mixer is different from a plant mixer.

The speaker predicted that concrete specifications are coming which will include the number of revolutions of the mixer drum.

Mr. Walker emphasized the desirability of having at least one trained concrete engineer in every ready-mixed concrete plant. He referred to the special short courses in concrete technology being given at the University of Maryland. Several hundred men now in ready-mixed concrete plants have attended these courses, he said.

A banquet at the Fort Hayes Hotel Monday night, with 204 attending, was the only social feature of the two-day gathering. R. P. Mumford, chairman of the committee was toastmaster.

Dr. A. Allan Bates, the Portland Cement Association's vice president for research and development, was the guest speaker at the banquet. He pointed out that the question of how to keep our overwhelming productive capacity busy is a present national problem. He looks at construction as the bellwether industry of the nation and said he believed construction will be the leading industry for at least the next five years.

Dr. Bates referred to scheduled military construction, a vast highway modernization plan, needed slum clearance, the rehabilitation of cities and the growing necessity of more schools and hospitals as evidence of the part construction is certain to play in the national economy. He said that according to United States Bureau of Mines published estimates, portland cement will be available for all construction requirements.

Two Movies on Concrete

Two colored motion pictures loaned by the Portland Cement Association were shown on the second day's program. The first, shown in the morning was "How to Transport, Place, Finish and Cure Quality Concrete." The picture shown in the afternoon was "Quality Ready Mixed Concrete."

After the morning picture those in attendance were divided into three groups. One group was assigned to the Physics Building for a lecture on "Research in the Field of Concrete" by Prof. L. E. Vandegrift of the University's civil engineering department. The other two groups participated in laboratory work directed by Prof. Trevor Craig and Prof. Carl Purtz in the Engineering Experiment Station Building. The laboratory work included demonstrations of the procedure in making all standard laboratory tests on concrete and standard sieve analysis of aggregates.

Research in Action

Prof. Vandegrift said, "It is foreseen that cement, as we now know it, will be out of the picture. The cementitious material of the future will be as carefully compounded as medicines are now compounded by a pharmacist. There will be, in addition to the common materials that we now know, limestone, shale, clays and iron ores. There will also be organic compounds, wetting agents, dispersing agents, alkali salts and numerous pozzolonic

materials. At that time we will be able to buy and use cement that has all the desirable qualities of the cements now available without their objectionable qualities.

Prof. Vandegrift described in considerable detail recent research on concrete admixtures, proportioning, air-entraining and vibration done by the Ohio Engineering Experiment Station in cooperation with the consulting engineers on a large water supply dam. Among the problems to be solved were: reduction of the heat of hydration without the use of special "low heat" cement; determination of aggregate grading with the minimum of cement to produce the required strength; selection of a pozzolan of proper chemical characteristics available not too far from the job, and assurance of a workable mix. As a result of extensive laboratory studies a mix was developed as follows:

Materials	Quantities per cu. yd.
Cement	211.5 lb.
Fly ash	70.5 lb.
Glacial bank sand	855.0 lb.
Glacial No. 4 — ¾-in	521 lb.
Gravel ¾-in. — 1½-in.	558.0 lb.
Crushed 1½-in. — 3-in.	780.0 lb.
Limestone 3-in. — 6-in.	1004.0 lb.

Twelve-inch cubes made with this mix developed strength of 2800 p.s.i. in 28 days.

Prof. Vandegrift said, "A substantial saving in the reduction in cement was made possible by these studies and by the use of the fly ash. The saving has been estimated to be in excess of $50,000."

Prof. Vandegrift described early developments of lightweight aggregates and the recent recognition of the wide variety of uses for such aggregate.

"It is the belief of many that the use of lightweight aggregate concrete will increase as knowledge of the advantages of the material and the technique of handling it becomes more widespread, "Prof. Vandegrift declared. "I believe that the time is not far off when it will be a common thing to have the customer call the ready mix man for 3000 lb., 100 lb. per cu. ft. concrete that will not spall or disintegrate due to cold weather, and application of salt for de-icing purposes.

Prof. Vandegrift listed ten features of lightweight aggregate that merit further study.

Operating Problems Panel

The final feature of the two-day course was a panel discussion of operating problems with James A. Nicholson, president of the Nicholson Concrete Co., Toledo, as moderator. Panel members were: R. W. Ochsenhirt, Botzum Bros. Co., Akron; A. F. Liggett, Hilltop Building Materials Inc., Cincinnati; R. P. Mumford, Beckley & Myers Co., Springfield; Roger Slugg, Hamilton Gravel Co., Hamilton; E. E. Osborn and Everett Beam, both of Clinton Construction Co., Wilmington.

In order that all those in the audience might participate in the panel discussions, Moderator Nicholson suggested that nine different topics under the general subject, "Operating Problems," be taken up. He assigned a chairman for each topic with one or two discussion leaders. The subject chairmen and discussion leaders held a caucus with the different groups before the formal panel discussions were open.

In adjourning the final session, President Shoaff announced that the 1956 Short Course would be held at the University of Akron.

Centrifugal, reinforced concrete pipe plant of United Concrete Pipe Corp., Baldwin Park

United Concrete Pipe Expansion

UNITED CONCRETE PIPE CORP. recently completed a large expansion program at its Baldwin Park, Calif., plant which produces centrifugal reinforced concrete pipe. The expansion program, designed to triple plant capacity, has boosted production to about 1500 ft. of centrifugal pipe, in diameters ranging from 12 to 84 in., in an average 8-hr. shift. All new equipment installations, with the exception of concrete mixers, various electric power units, and a boiler, were designed by United Concrete Pipe Corp.'s engineering staff and manufactured in the company's own shops.

The company's centrifugal pipe manufacturing process, which features the use of one-piece molds in contrast to the conventional split-mold method, reportedly helps produce concrete pipe of uniform and consistently high quality. To permit removal of completed pipe sections from the molds, a heavy coating of hot wax is first applied to the inside of the mold as it revolves on a special turning device. Molds are handled to and from the spinning machine by special strongbacks and 15-ton monorail hoists. Motor-driven trolleys and hoists handle the steel-reinforcing cages, which are wound in an elliptical shape, with all transverse and longitudinal rod intersections automatically welded. The completed cages are positioned and suspended within the waxed molds by using overhead cranes and "C" hooks. Cage spacing is carefully checked prior to spinning the pipe.

Concrete aggregates and cement are weigh-batched in separate scales and transported to one of three mixer stations by a 24-in. belt conveyor system. A full batch is stored in a 3-cu. yd. collecting hopper over each tilting-type mixer. Operation of the mixer prevents segregation of materials. The charging and discharging of the concrete mix are regulated by air controls. The mixer discharges into the 7-cu. yd. hopper of a special belt-charging unit which meters uniform amount of the mix into the revolving molds.

The newly spun pipe are steamed at a controlled temperature, below the melting point of the wax, for 6 to 8 hr., after which the temperature is increased so that the wax melts and runs out of the molds. This provides a space between the outside of the pipe and the inside of the mold, permitting the removal of the finished pipe from the one-piece mold. The wax is collected through troughs and separators for re-use. The pipe are stripped from the molds by a specially designed hydraulically operated mobile stripping unit which simultaneously delivers the mold back to the waxing skids and the pipe to storage skids. In some cases, curing is continued for an additional six days by keeping the pipe surfaces moist.

United Concrete Pipe Corp. also produces various other types of concrete pipe at its Baldwin Park plant, as well as at its 15 other plants located throughout the West.

Production lines for the manufacture of Ytong masonry units. One line of full molds is moving toward cutting machine

Close-up of cutting machine. Hydraulic lift has raised the mold up to the cutting wires

First Ytong Plant in North America

• Alberta Ytong Manufacturing Co., Ltd., Calgary, Alberta, Canada started operation early in 1955 with a production of 100 cu. yd. per day. Capacity could be increased to 400 cu. yd. daily in two stages of plant additions

By J. C. ORTENGREN*

PRODUCTION OF YTONG LIGHTWEIGHT BUILDING UNITS in a new factory at Calgary, Alberta was recently started by Alberta Ytong Manufacturing Co., Ltd. This is the first plant on this continent to make the product commercially under franchise from the International Ytong Co. A. B., Stockholm, Sweden. However, its value has been thoroughly established in Sweden where it originated some 25 years ago and where it has played an important part in revolutionizing that country's building industry so that the use of lumber in house construction alone since the war has been reduced from approximately 85 to 14 percent. Ytong is a Swedish trade name for the lightweight cellular building material.**

In lumber-rich Sweden, with a population of only 7½ million, the six Ytong plants today produce over 490,000 cu. yd. per year, sufficient to build over 16,000 average size five room bungalows which, according to Swedish standards, is enough to house over 80,000 persons.

Since 1948, several plants also have been established in other European countries and Israel with a combined output exceeding home production.

The Calgary plant, located in the new Manchester industrial section of this important and rapidly expanding oil capital of Canada, was designed for an initial output of 100 cu. yd. per day but which, as demand increases, can readily be increased in two successive steps to 200 to 400 cu. yd., respectively.

Buildings are mainly of the Butler rigid frame type with a 14-ft. wall and a combined floor area of 28,000 sq. ft. The outside wall covering is galvanized sheet iron but the walls will be lined on the inside with 6-in. Ytong block. This will insure a warm and dry plant even under the severest weather conditions with temperatures during the winter months sometimes dropping as low as 40 deg. below zero.

The plant is divided in seven sections: (1) raw material handling and drying; (2) grinding; (3) mixing, (4) precuring and cutting; (5) autoclave; (6) reinforcement section; and (7) boiler house.

Tongs suspended by hoist unloading masonry units

* Secretary and Manager, Alberta Ytong Mfg. Co., Ltd.

**Lightweight Building Units of Autoclaved Lime and Siliceous Material, by Eric Ahlstedt, Rock Products, June, 1952

Mixing and Grinding Operation

Mixing and grinding sections, both 40 ft. in height, are of structural steel and similarly covered. To assure the maximum of daylight, a large number of plastic light panels have been inserted in the roofs.

The basic raw material for Ytong is some silica-rich material and high calcium lime. In Calgary a high silica shale is being used. It is brought by rail from the company's own quarries some 55 miles distant, and unslaked lump lime is purchased locally. However, other siliceous materials, such as pumice, fly-ash, water granulated slag and many others, could also be used. The aerating agent is aluminum powder with certain other chemicals.

From the railroad cars, which are unloaded by a clamshell, the shale is transported directly over a 30-in. belt conveyor to a 4- x 8-ft. Dillon screen, with the over-size material going to a Williams slugger mill from which it is returned to the screen. Throughs from the screen are sent to a 6- x 35-ft. rotary gas-fired dryer.

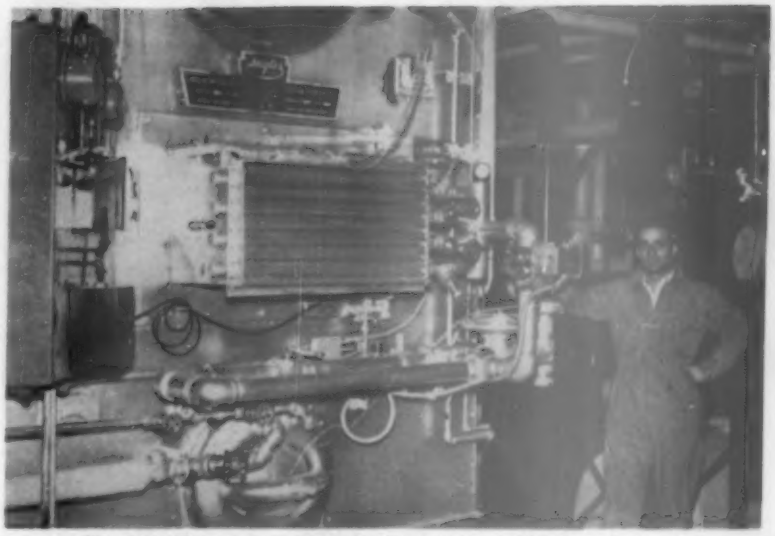
From the dryer the shale is taken by screw conveyor and bucket elevator to the shale storage bins in the grinding house. The lime, brought into the plant in carload lots, is unloaded by the same machinery to storage in the lime bins.

Processing Operation

From the storage bins the lime and shale are fed in their correct proportions into a 6- x 12-ft. open circuit Denver ball mill and dry-ground to the desired fineness, using approximately 17 tons of cast grinding balls. From the ball mill the Ytong "flour" is then lifted by bucket elevator to storage in huge metal silos.

Before being taken from the silos and used in production, this "flour" receives a further blending and homogenizing by means of mechanical devices and air, and is then conveyed through screw conveyors to the buffer bin from which it is weighed and discharged into the mixer in carefully controlled quantities.

The interlocking control board for the homogenizing and blending machinery is situated at the mixing station, thereby enabling the operator to have at his fingertips, full control of the material flow from the ball mill to the discharge valve in the mixer. The mixer, of the International Ytong Company's own design and imported from Sweden, has a volume of approximately 1½ cu. yd. During this mixing process, the aluminum powder and other activating agents are added together with water and, after being thoroughly mixed, are emptied into 4 ft. by 8 ft. by 18 in. deep molds.



"Packaged" steam generator which supplies steam for the autoclaves

The filled molds, supported on specially designed ball bearing four wheel trucks, are transported from the mixer by means of a rail traverse, electrically operated, to the curing tracks, where they are taken over by automatic chain conveyors, set in troughs in the floor, and brought forward while the Ytong slowly rises and presets to the desired density. After having been air-cured and having reached the correct stage of hardness, the molds are rolled forward to the opening station where the four sides of the molds are automatically opened and dropped before a "step feeder" takes hold and delivers them to the cutting machine. At the cutting station, the material is cut into desired sizes by two cutting machines of the Ytong company's own design which uses a fine stainless steel wire as a cutting medium. The standard size being made at the Alberta plant is 12 x 18 in. and any desired thickness from 2 to 14 in.

Of special interest are the automatic mold opening and closing stations. There are two of each. The hydraulically operated machines open and drop, lift and close the four sides without manual assistance. The Calgary operation is the third Ytong plant where this new, efficient and labor saving machinery has been installed. Three men were formerly needed for this particular operation.

The "step feeders" are also designed and adapted especially to suit the Ytong production tempo. They move the molds forward on their trucks at a regular predetermined speed, and halt the trucks at the various working stations long enough to permit the completion of the work at each stop.

At the cutting station, the surplus material is scraped onto a 14-in. belt conveyor running below floor level for the entire length of that section, and then elevated through a Redler elevator onto another 14-in. belt conveyor suspended from the roof which takes it back to the mixing station for reuse. The molds are taken a step farther to the mold closing station where the four sides are closed and then conveyed to the autoclave traverse.

Three Autoclaves Complete Curing

At that point the molds are doubled up, two to a truck, and then transported to an autoclave for steam cur-

General view of entire plant devoted to the manufacture of Ytong building units of various shapes and sizes

One of the three autoclaves used in final curing process

ing. The present autoclave battery consists of three 84-in. by 74-ft. vessels fitted with quick-opening doors of the bayonet type of Swedish design and manufacture. The block are cured the prescribed time under pressure of approximately 142 p.s.i. Each autoclave holds 16 molds per charge on eight trucks.

The steam requirements for this production are quite high and considerable thought was given to the design of the boiler house and selection of equipment before a John Inglis water tube boiler was decided upon. It is a fully automatic, gas-fired Inglis packaged water tube steam generator which supplies and regulates steam to a bank of high pressure autoclaves without the use of further steam regulating equipment. The boiler operates at a 5 lb. pressure differential to maintain a constant pressure of 145 p.s.i. in the autoclaves regardless of the load fluctuation.

The boiler itself is very compact, requiring a minimum of floor space and is equipped with integral programmer induced draft fan, high and low water cut-offs with feed water regulation, sensitive modulating pressure combustion control, steam control, electric igniter, safety valves, fire scanner, purge timer and an intricate alarm system.

Due to the nature of the Ytong process, returns from the autoclaves must be discarded, necessitating an elaborate feed water treatment system. The raw water runs through a series of water softeners into a storage tank equipped with heating coils. This hot water storage tank serves to store water for plant use and to furnish the boiler requirements. The boiler feed water runs from the hot water storage through a deaerating heater and from the heater to the Inglis boiler feed pump and boiler.

The boiler was designed for 10,500 lb. steam per hr. at 145 p.s.i. operating pressure, but under operating conditions it has greatly exceeded these ratings. It has proven to be a fast producer of steam, very capable of handling swinging loads and yet requiring a minimum of attention.

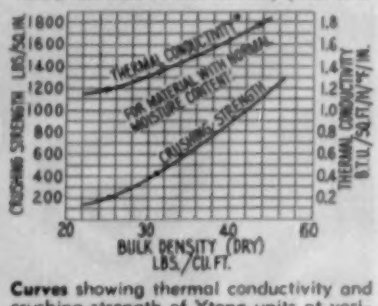
Handling from Autoclaves

Upon completion of the curing cycle, the molds are again placed, one to a truck, by means of a hydraulic hoist on the autoclave traverse and shuttled onto the unloading track.

While being conveyed to the unloading station by another set of automatic "step feeders" the molds are momentarily stopped at a second mold opening pit where the four sides are again dropped and the truck returned to the unloading bay.

At this station, a specially designed gripping device lifts the entire charge in one operation from the mold, and the load is carried out on an "I" beam over the loading platform for loading on trucks or transfer to the storage yard.

After the unloaded molds and trucks reach the end of the circuit, (still conveyed forward by the step feeder at the predetermined tempo), they are cleaned, oiled and made ready for a new charge. The entire production cycle has taken less than 24 hr.



Curves showing thermal conductivity and crushing strength of Ytong units at various bulk densities

Also Make Roof and Wall Panels

Besides Ytong building block, the Alberta plant will also manufacture lightweight roof and wall panels of remarkable lightness and strength. Special machinery is being installed in the reinforcement section which will be in operation this spring. Molds intended for this purpose will be taken directly from the oiling station to this department where they will be charged with the necessary steel reinforcement. Prior to placing in the molds, the reinforcing steel has undergone special bending and anticorrosion treatment. This department also will turn out reinforced lintels for windows and door openings.

The production of Ytong units is a very exacting process for which it is necessary to possess not only an intimate technical knowledge and know-how but also a constant check must be kept on the materials and production. A well equipped laboratory, capable of maintaining a continuous check on the materials used and the consistency of their blending, is maintained for this purpose.

Technical Properties

It is the cellular structure of Ytong, consisting as it does of from 75 to 85 percent of air cells totally enclosed by thin walls strengthened by high pressure steam curing, that gives this material its high thermal insulation, low weight but strong enough for the purpose it is intended.

The Alberta plant will produce Ytong in three bulk densities to meet varied requirements of strength, lightness, and thermal conductivity. The graph (Fig. 1) illustrates typical values of crushing strength and thermal conductivity in relation to the dry bulk density. The three densities will weigh (dry) 41, 31 and 26 lb. per cu. ft., and have a crushing strength of 940, 450 and 325 p.s.i., respectively.

From the foregoing description of the working process and the illustrations shown, it should be evident that a Ytong plant represents a considerable capital investment. However, before launching this undertaking, careful cost estimates and production figures were brought out which satisfied the promoters of the enterprise that Ytong is a material which can be produced economically in almost any locality and offered at a price competitive with other materials now in use.

In considering these facts, it must be borne in mind that it is not the

unit price per block which is the deciding factor but rather the over-all cost of a completed Ytong wall that tells the tale. Because of the material's lightness, the block can be made larger and still weigh less than the ordinary concrete block. Taking for granted that both types of blocks could be placed in a wall for the same unit cost, it is self-evident that a considerable saving can be accomplished in labor alone since it requires 113 standard 8- x 8- x 16-in. block per hundred square feet of wall area as compared with only 66 standard 12- x 18-in. Ytong block.

Because of its outstanding insulation qualities no other type of insulation or vapor barriers are needed. Simply apply plaster on the inside and any desirable finish for the outside, such as siding, stucco, asbestos shingles, etc. Nor are any laths required because the plaster or stucco is applied directly to the surface.

Since the commencement of operations, the company has readily disposed of its product for both private building and government sponsored undertakings, such as the Provincial Government Research Laboratories in Edmonton and a large hospital in the same city. Orders for shipments to cities in the adjoining province of Saskatchewan have also been received and delivered.

Construction of the Alberta plant has been under the personal supervision and direction of J. G. Ortengren of Vancouver, British Columbia, who was instrumental in introducing Ytong to Canada and now, together with associates, holds the franchise for both Canada and the United States.

The Alberta Ytong Manufacturing Co., Ltd. Board of Directors consists of: C. R. Walker, president, a prominent Calgarian and president of the Merrill Petroleum Ltd.; N. E. Tanner, former Minister of Lands and Mines in the Provincial Government of Alberta and now president of Trans-Canada Pipe Lines Ltd.; A. V. Carlson, treasurer, well-known Edmonton building contractor; E. R. Mackay, vice-president; and Calvin Muir, director. The two last named represent Steel Brothers and Co. Ltd., London, England, principal backers of the project. J. G. Ortengren is secretary and manager.

J. G. Ortengren

Mason laying up Ytong block

Production manager and in charge of the plant is Ulf Palm, a Swedish Ytong engineer and chemist, who joined the Canadian organization last May. He is assisted by the chief chemist, Y. Rumma, and a laboratory technician.

The present work crew consists of a plant foreman and 18 men which includes general maintenance men. However, when operated with two or more shifts, 12 to 14 men per shift will be needed plus the boiler house staff.

Masonry Building Code

THE AMERICAN STANDARDS ASSOCIATION has announced that requirements for masonry construction of all types (American Standard A41.1) have recently been reviewed and revised by a national committee on Building Code Requirements and Good Practice Recommendations.

The American Standard covers specifications suitable for use in building codes, and applies to design as well as construction. It includes definitions, specifications for materials, allowable stresses and such miscellaneous requirements as those for thickness of foundation walls, bonding of masonry walls, spacing, chases and recesses, protection against freezing, and bracing against lateral loads.

American Standard A41.1 may be obtained from the American Standards Association, 70 E. 45th St., New York 17, N. Y., for 20 cents per copy.

Perlite Concrete Fire Test

THE PERLITE INSTITUTE reports that an unprotected 24-gauge corrugated steel roof deck, insulated with perlite concrete, withstood 60 min. of continuous fire exposure at temperatures reaching 1700 deg. F., qualifying the roof deck for an official Underwriters' Laboratories one-hour fire rating.

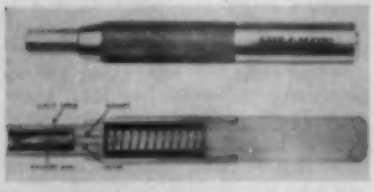
The overall thickness of the deck was 3½ in., from the bottom of the corrugation to the top of the 2⅞ in. thick perlite concrete slab. A 4 x 8 — 1214 wire mesh was placed in the perlite concrete to act as temperature and shrinkage reinforcing and to help carry the 40-lb. live load, since the load-carrying capacity of the metal deck decreases at temperatures over 1000 deg. F. After completion of fire and hose stream tests, the construction was double loaded with 80 p.s.f. and almost no additional deflections were noted.

The underside of the deck was left exposed, and no fire resistive ceiling was required, although supporting beams were boxed with metal lath and ⅞ in. of perlite-gypsum plaster. At the end of one hour of fire exposure, the average beam temperature was 340 deg. F.

NEW MACHINERY

Continuous-Type Mixers

THE COLONIAL IRON WORKS CO., 17643 St. Clair Ave., Cleveland, Ohio, has announced a line of continuous-type mixing and pugging machines, formerly manufactured by The W. A. Anthony Engineering Co. The machines are designed to handle material sizes from dust to 2 in., in either a dry state or in a slurry. The mixers feature an all-welded frame of heavy steel plate; standard replaceable mixer trough of heavy-gauge material; box-type construction; a safety guard over the mixing portion of the trough; simplified drive mechanism with a standard NEMA frame motor; and a diversion plate at the mixer discharge to eliminate segregation tendencies. Capacities range from 5 to 50 cu. yd. per hr. In addition to the mixers, equipment designed for feeding is available for use with any type standard trough. Bins, bucket elevators, conveyors, etc. are also available.



Masonry Nail Driver

SAFETY NAIL DRIVER CORP., Clifton, N. J., has developed the Safe-T-Matic nail driver for driving masonry nails into concrete, cinder block, concrete block, and light and medium gauge metals. The tool features a built-in permanent magnet which holds the nail in the correct position, and a sliding safety shield to eliminate the danger of flying nails. It handles masonry nails of ⅓ to 1⅛ in. long, and can be used for fastening clamps to concrete block walls or cables, conduits, tubing, brackets, fixtures, cornices, gutters, leaders, etc.

Offset Bolts

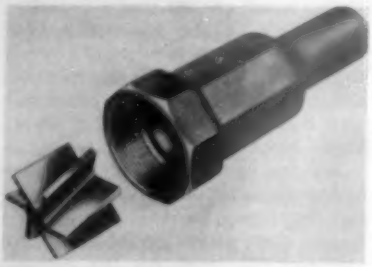
ENGMAN MANUFACTURING CO., 1317 Locust St., Des Moines 9, Iowa, has announced the addition of series AB-300, offset anchor bolts, designed especially for two-core block, to its line of construction anchoring specialties. The bolts are said to be applicable to brick, tile, and poured concrete wall and slab construction, and have been constructed and designed so as not to twist or turn. The series is manufactured to meet individual specifications.

Liquid Meter Register

NEPTUNE METER CO., 19 West 50th St., New York 20, N. Y., has announced the Print-O-Meter, a liquid meter register which automatically stamps a ticket with the number of gallons or pounds of liquid ingredients delivered to a batch or process. It also prints letters and serial numbers on the ticket to identify the operator and batch. It is available with Type S industrial meters in sizes from 1 to 4 in., for rates of flow from 5 to 500 g.p.m. It can also be combined with the Auto-Stop and Auto-Switch registers which automatically shut off a valve and/or actuate a Microswitch when the preselected quantity has been delivered.

Concrete Manhole Panels

SYMONS CLAMP & MANUFACTURING CO., 4249 Diversey Ave., Chicago, Ill., has brought out special panels designed to be grouped in an octagonal shape and used in pouring concrete manholes. The panels consist of a magnesium frame, with a panel of plastic face plywood; have no tie openings; are cross braced and held together by connecting bolts and wedges.



Spray Nozzles

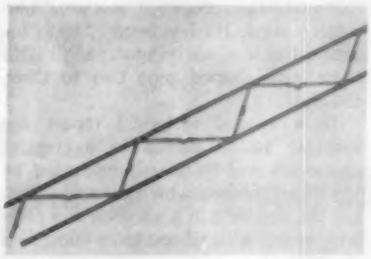
SPRAYING SYSTEMS CO., 3201 Randolph St., Bellwood, Ill., has introduced a line of industrial spray nozzles, known as the 15-deg. injector type FullJet nozzles, ranging in size from 1¾ in. long with a capacity of 1.5 g.p.m. at 10 p.s.i. to 17 in. long with a capacity of 1108 g.p.m. at 100 p.s.i. At 40 p.s.i. the nozzles have a spray angle of 15 deg., delivering a medium high impact for applications where a combination of heavier impact, compact full cone spray and where a wide choice of capacities is desired.

Large Cube Block Forks

TOWMOTOR CORP., 1226 E. 152nd St., Cleveland 10, Ohio, has announced a fork lift truck equipped with 12 individual forks mounted on a special, extra-wide carriage, for handling concrete block, The truck, Model LT-60, features dual drive wheels and a "Side Shifter," which shifts the carriage and forks 3½ in. to the right or left of center for accurate alignment of forks in picking up a cube of block, and for accurate set-down without repositioning.

Concrete Slump Brick Machine

GENERAL ENGINES CO., 307 Hunter St., Gloucester, N. J., has introduced the Model R-100 Rainbow Rock concrete adobe slump brick machine, with a capacity of 6000 units daily. It features a sealed compressed air system; vibrator assembly mounted on sealed, self-aligning ball bearings; and is powered by a heavy duty 1-hp. electric motor. Other models are available for the manufacture of concrete block and specialty units.

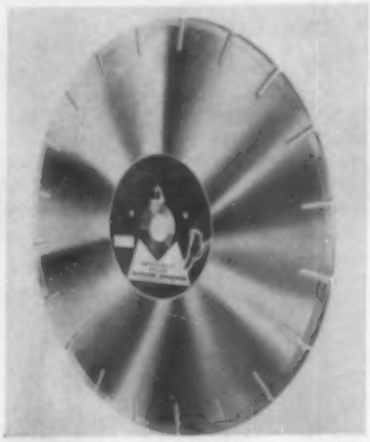


Cavity Wall Ties

CEDAR RAPIDS BLOCK CO., 650 12th Avenue S. W., Cedar Rapids, Iowa, has announced Dur-O-wal cavity wall reinforcing, formed with drip cross rods that serve as wall ties. It is made from high tensile steel rods, deformed and electric butt welded, and is designed to provide maximum anchorage with positive and uniform spacing of ties. The drip section wall ties for cavity wall construction are furnished with steel side rods and galvanized cross rods, or with all rods of galvanized steel.

Air Entraining Agent

ALUMINUM INDUSTRIES, INC., Permite Concrete Curing Compound Div., Cincinnati, Ohio, has announced "Permite N-Tair," an air-entraining agent for concrete. A clear amber low-viscosity liquid, it is a homogeneous solution, which is claimed not to segregate, settle out, become gummy, or lose efficiency during storage. It is available in single- or double-strength solutions, and is packaged in 5-, 30- or 53-gal. containers.



Diamond Blades

CARDINAL ENGINEERING CORP., Philadelphia 27, Penn., has brought out a "king size" diamond blade for cutting brick, tile, concrete, refractory and other types of hard masonry materials. It is available in 14- and 16-in. sizes, and is made for wet cutting use on a standard masonry saw. Each diamond bearing segment is individually molded, and they are guaranteed not to come off in normal use. The blades are available in a variety of special specifications for specific cutting jobs, as well as in a general purpose type for contractors or plants with a variety of masonry cutting requirements.

Compression Tester

FORNEY'S INC., Box 310, New Castle, Penn., has added Model PT-75 to its line of compression testers, which tests concrete, clay and tile pipe from 12- to 72-in. inside diameters, in lengths up to 8 ft. It has a ram pressure of 150,000 lb., and is equipped with a Forney hydraulic system, embodying a 6-in. diameter ram with a spherical end to automatically compensate for any mis-alignment of the pressure beam. A dual high and low pressure pump is provided, as well as a Bourdon tube working gauge and a laboratory proving gauge so that calibration can be checked as often as desired. The machine weighs close to 4000 lb. and stands 15 ft. high. It is also available in larger and smaller sizes to meet specific requirements.

Pallet Handling

THE GENE OLSEN CORP., 401 Grace St., Adrain, Mich., has developed the "Rack-Man," a machine which automatically receives green block as they come from the plain pallet machine, places them on decks of standard steel racks, and simultaneously removes and delivers empty pallets back to the block machine. The device is entirely above the floor, requiring no pits. An additional piece of equipment is available for use in connection with the machine, which permits placing racks loaded with cured block on the "Rack-Man." The pallets of cured block are removed simultaneously with the placing of green block on the rack. The cured block are conveyed automatically to a nearby cubing station and the empty pallets returned to the block machine. The devices are available for use with GoCorp, Besser and Bergen plain pallet machines.

Hydraulic Couplings

JOY MANUFACTURING CO., Oliver Bldg., Pittsburgh, Penn., has introduced a line of hydraulic hose and couplings, designated "Surgepruf," for medium-high and high pressure service. The couplings feature a "double-wedge" grip which is said to permit assembly on rubber covered hose without skiving. A special slotted bushing is designed to allow retightening of the coupling on the hose without disassembly if vibration or flexing loosens the coupling. No special tools or mandrels are required for assembly.

CENTRIFUGAL METHOD of Pipe Manufacture

By DR. F. O. ANDEREGG

CONCRETE PIPE MANUFACTURE, with emphasis on the centrifugal process, has been receiving widespread attention in the German technical press.* Prof. E. Marquardt of the Stuttgart Technical School reviewed the progress during the past 30 years, and pointed out how remarkable it has been. The tremendous increases in pipe size, in the density of the concrete, in jointing methods and in impregnation have indeed been outstanding. Prestressing, following Freyssinet's pioneering, including lengthwise and circumferential reinforcing, has permitted transmission of liquids under very high pressure.

In another article, Alfred Meyer describes modern manufacturing methods used in casting centrifugal poles and pipe. For large diameter and medium sized pipe, he has developed special machinery. The mixer produces a very plastic concrete which is introduced into the form by means of a long trough. By inverting the trough the concrete is dumped into the form. The form is then rotated at a prescribed speed and for a definite period, after which the water that has collected inside the tube is allowed to run out. Poles as long as 100 ft. are being produced, and with prestressing considerable savings in steel and concrete are being effected.

Specifications are given by Engineer von Kathen in which the optimum grading of the aggregate are laid down, Fig. 1. It has been found to be advantageous to use about 3 percent

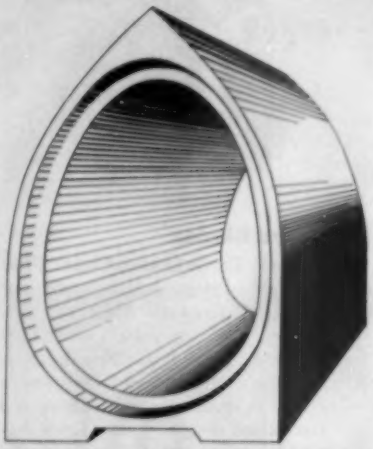


Fig. 3: Concrete pipe design to increase load capacity

of very fine sand to secure a very dense concrete in the centrifugal machine. It is essential to have a very plastic mix where vibration is used; a coarser grade may be effectively utilized. The water tightness of the

*Betonstein Zeitung, Wiesbaden, Germany, July, 1952.

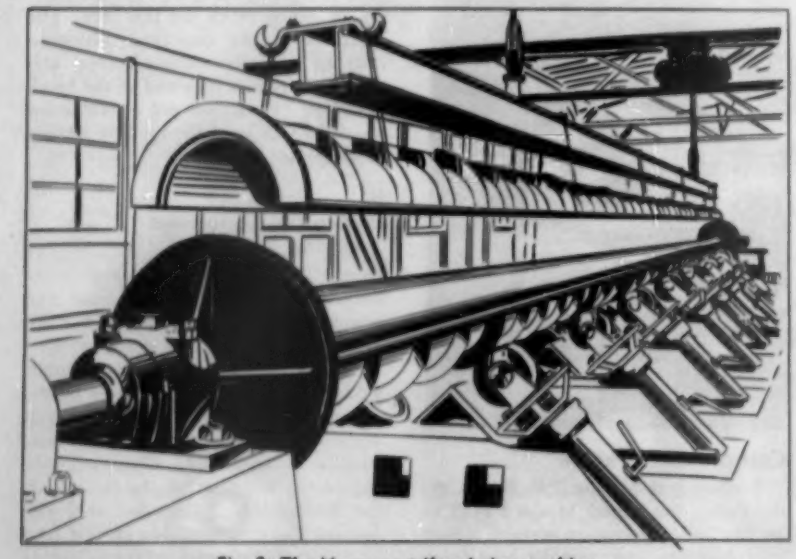


Fig. 2: The Meyer centrifugal pipe machine

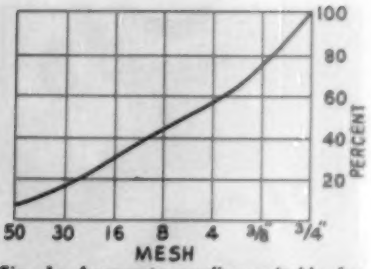


Fig. 1: Aggregate grading suitable for centrifugal pipe manufacture

pipe and their compression strength are the most important properties. Statistics are given showing the typical variation among test results which indicate that further increases in specification requirements might well be adopted.

Engineer H. Vogt describes the newest Swedish specifications for concrete pipe issued in December, 1949, including compressive strength and resistance to carbonated water. These seem to be quite high.

The Danes have a variety of machines for making concrete pipe; including straight tamping, tamping combined with vibration, vibration alone, and vibration with hydraulic pressure.

To increase the load-carrying capacity of unreinforced pipe, Engineer B. Keseling, has proposed a shape like a steep roof. He has been able to increase the load-carrying capacity with these oval shaped pipe two to three times.

In a special technical report the increase in resistance to aggressive chemicals and to abrasion secured by the Ocart method which involves treating the concrete in a vacuum and pressure vessel with silicon tetra-fluoride is described.

Cellular Concrete Booklet

THE AMERICAN CONCRETE INSTITUTE has issued a reprint from the ACI Journal entitled "Cellular Concretes" by Rudolph C. Valore, Jr., materials engineer, National Bureau of Standards. The 44-page booklet contains a review of methods of preparation and physical properties of moist and high-pressure steam-cured cellular concretes, ranging in densities from 10 to 100 lb. per. cu. ft., as they have evolved in Europe in the past 30 years. Data is given for Swedish, Danish, Russian, German, British and Belgian materials, and for experimental mixtures prepared by the National Bureau of Standards. Aluminum powder and hydrogen peroxide gas-forming processes and the excess water process are also described. The reprint is available from the American Concrete Institute, 18263 West McNichols Rd., Detroit 19, Mich., at a cost of $1.

Why Penalize Your Profits in Ready-Mix Operations!

Why take a chance when you don't have to! You can protect your investment . . . protect your profits by buying exactly the truck mixer you need for most profitable operations . . . a Rex Adjusta-Wate Moto-Mixer.

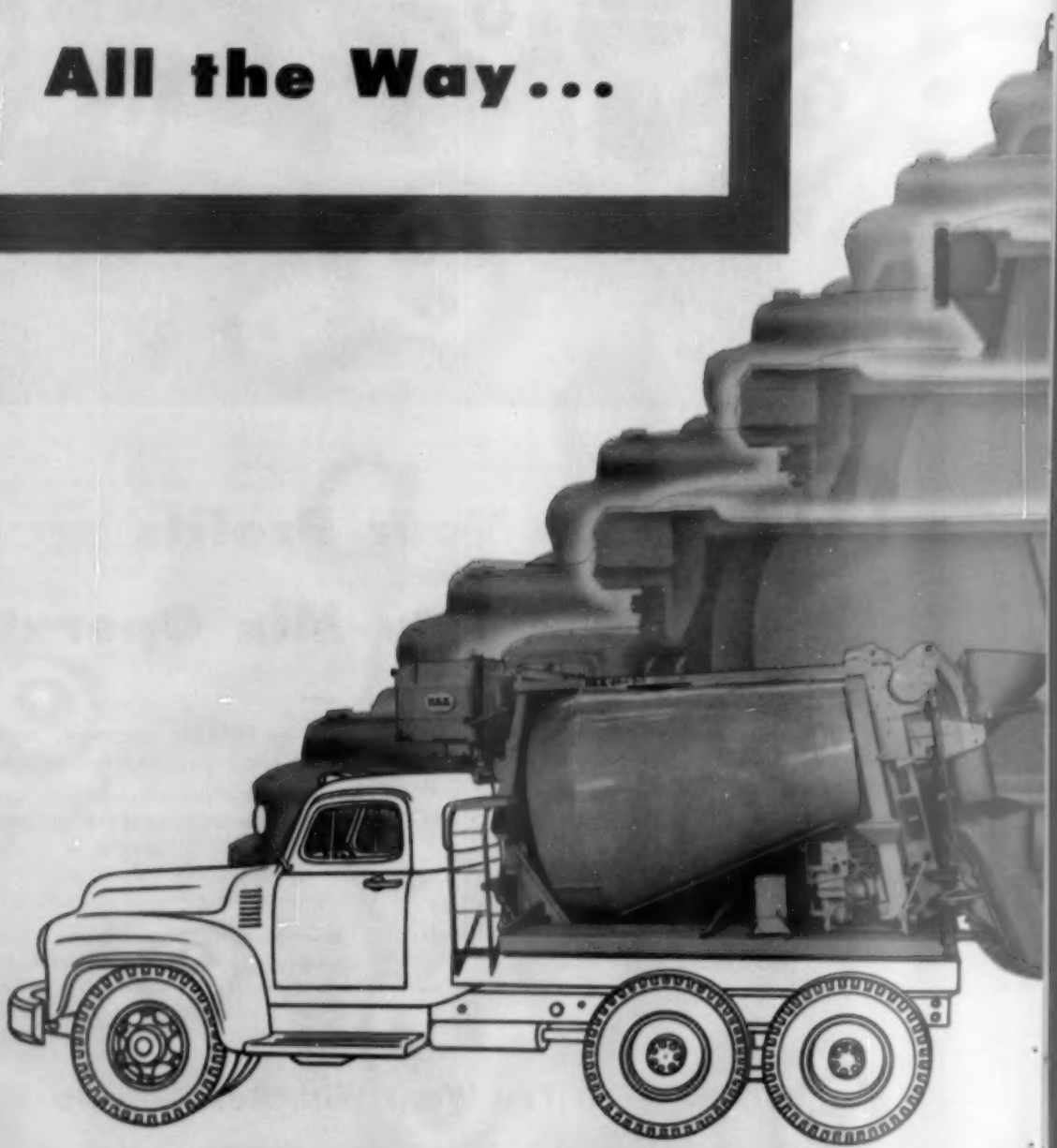
Think you can't afford the best? You can . . . because there's a Rex Adjusta-Wate that exactly fits your operating needs . . . your weight limitations . . . and your pocketbook! If you want *low* first cost . . . or if you want a truck mixer that will stand up under the *toughest* continuous heavy-duty service . . . you can have it in a Rex Adjusta-Wate.

Don't take a chance on less than the best. Get all the exclusive Adjusta-Wate advantages that mean you haul more . . . save more . . . every trip, every day, every season. You'll deliver the top-quality concrete that keeps your customers satisfied.

Don't penalize your profits . . . don't penalize your customers . . . protect yourself and your customers with the best . . . Rex Adjusta-Wate Moto-Mixers.

You Get What You Want With Rex Adjusta-Wate

Take Your Pick...
and Get Quality
All the Way...



Before You Buy Any Truck Mixer . . . Comp

Examine these two Rex Adjusta-Wate Mote-Mixers. See any difference? Yes, you can find some . . . but none that affect quality operation and performance. That's why, when you buy Rex Adjusta-Wate, you're not penalized because of your operating conditions and pocketbook.

If you want *low* first cost but still demand *top* quality, the Adjusta-Wate above is your choice. It differs only in its water system . . . discharge system . . . and transmission. But, no machine in its price class can compete with its quality.

Where your operating conditions do not demand a closed discharge . . . two-compartment water tank . . . or the extremely heavy-duty transmission . . . this machine is your best choice. It's low cost . . . lighter weight! It has the same quality construction . . . drum, blades, frame . . . as the most expensive Adjusta-Wate.

Where your operations are continuous, heavy duty . . . the most severe a truck mixer can encounter . . . you want the Adjusta-Wate at the left.

BUT, suppose your requirements fall in between these two classes. That's where Rex Adjusta-Wate again fits your needs. Because you can equip your basic Adjusta-Wate to fit any operating or cost requirement. And, it's still the top-quality machine you want . . . and need.

Don't take a chance! Get the best . . . a Rex Adjusta-Wate. We invite you to compare Rex with any other truck mixer. See for yourself why you'll be so much ahead . . . in performance, quality, cost and profit . . . with Rex.

re Rex Adjusta-Wate . . . ON PRICE . . . ON PERFORMANCE

To Serve the Needs of Western Operators The Cal-Rex Adjusta-Wate

To more efficiently serve the needs of western Ready-Mix operators, the Los Angeles Plant of Chain Belt Company offers the Cal-Rex Adjusta-Wate Moto-Mixer.

This efficient mixer incorporates all the exclusive Adjusta-Wate features that add up to more trips per day and per season . . . more profit for you . . . better quality concrete for your customers.

REX Horizontal and Adjusta-Hite Moto-Mixers

Built to the same top-quality standards as the Adjusta-Wate Moto-Mixers, these efficient, dependable machines assure unequaled performance. The Adjusta-Hite combines the advantages of a horizontal truck mixer with the high-discharge point of a high-discharge machine. Exclusive Rex Hydraulic System elevates the mixer body to the desired discharge position. It's a horizontal . . . it's a high-discharge . . . it's any point in between.

For the complete cost-saving story on the Rex Moto-Mixer line, see your Rex Distributor or write CHAIN Belt Company, 4695 W. Greenfield Ave., Milwaukee 1, Wis. There is a Rex Distributor in:

Albuquerque, N. M. • Albany, N. Y. • Alexandria, Va. • Atlanta, Ga. • Augusta, Ga. • Baltimore, Md. • Barre, Vt. • Billings, Mont. • Binghamton, N. Y. • Birmingham, Ala. • Boise, Ida. • Buffalo, N. Y. • Butte, Mont. • Casper, Wyo. • Cedar Rapids, Iowa • Charleston, S. C. • Charleston, W. Va. • Chattanooga, Tenn. • Cheyenne, Wyo. • Chicago, Ill. • Cincinnati, Ohio • Clarksburg, W. Va. • Cleveland, Ohio • Columbia, S. C. • Columbus, Ohio • Concord, N. H. • Dallas, Tex. • Davenport, Iowa • Denver, Colo. • Des Moines, Iowa • Detroit, Mich. • Duluth, Minn. • El Paso, Tex. • Eugene, Ore. • Fairport, N. Y. • Ft. Wayne, Ind. • Grand Rapids, Mich. • Great Falls, Mont. • Greensboro, N. C. • Greenville, S. C. • Harrisburg, Pa. • Hartford, Conn. • Hibbing, Minn. • Houston, Tex. • Indianapolis, Ind. • Iron Mountain, Mich. • Jacksonville, Fla. • Jamaica, N. Y. • Kansas City, Mo. • Knoxville, Tenn. • Lexington, Ky. • Little Rock, Ark. • Longview, Tex. • Los Angeles, Cal. • Lubbock, Tex. • Luckey, Ohio • Macon, Ga. • Melrose Park, Ill. Memphis, Tenn. • Miami, Fla. • Milwaukee, Wis. • Minneapolis, Minn. • Nashville, Tenn. • Newark, N. J. • New Orleans, La. • New Philadelphia, Pa. Newton Highlands, Mass. • New York, N. Y. • Norwalk, Conn. • Oklahoma City, Okla. • Omaha, Neb. • Owensboro, Ky. • Paducah, Ky. • Philadelphia, Pa. • Phoenix, Ariz. • Pittsburgh, Pa. • Pocatello, Ida. • Portland, Ore. • Reno, Nev. • Richmond, Va. • Roanoke, Va. • Rockford, Ill. • St. Louis, Mo. Salt Lake City, Utah • San Antonio, Tex. • San Francisco, Cal. • Seattle, Wash • Shreveport, La. • Sioux Falls, So. Dak. • So. Portland, Me. • Spokane, Wash. • Springfield, Ill. • Syracuse, N. Y. • Tampa, Fla. • West Palm Beach, Fla.

CHAIN BELT REX® COMPANY **CHAIN BELT COMPANY**

Litho in U.S.A. — M. P.

Lightweight Concrete Subject of Major Interest At A.C.I. Meeting

• American Concrete Institute annual convention in Milwaukee, February 21-24 hears progress report on long-time study of cement performance in concrete; European precast concrete; batching equipment survey; and prestressed concrete

Chas. S. Whitney, new president of American Concrete Institute

INCREASING IMPORTANCE OF LIGHTWEIGHT CONCRETE was highlighted in technical papers at the 51st annual convention of the American Concrete Institute in Milwaukee, Wis., February 21-24. Improvements in concrete construction equipment and the necessity of close attention to concrete construction methods as well as to the design of concrete mixtures, were given especial emphasis. More than 900 were registered for the meeting, including 75 women. This is the largest attendance in the 51-year history of the Institute. The first day was devoted entirely to working sessions of technical committees.

New Long Time Study

An outstanding feature of the meeting was the presentation of a new chapter in the long time study of cement performance in concrete in the form of a paper by Frank H. Jackson, formerly principal engineer of tests of the Bureau of Public Roads, Washington, D. C., now a consulting engineer. Mr. Jackson's paper was entitled, "Correlation of the Results of Laboratory Tests with Field Performance Under Natural Freezing and Thawing Conditions."

In a foreword to his paper, Mr. Jackson said: "One of the major objectives of the Long Time Study of Cement Performance in Concrete was to determine the significance, in terms of field performance, of the numerous laboratory tests that have been developed from time to time in an effort to define desirable characteristics of portland cement for both general and specific uses. Such tests include, in addition to the generally used A.S.T.M. tests for fineness, strength, soundness, etc., many tests designed to measure other specific properties of cements such as bleeding characteristics, tendency to premature stiffening, cracking tendency, heat of hydration, resistance to freezing and thawing and to sulphate attack and so on. They include also several tests such as the Merriman "sugar" test, the Paul clinker autoclave test and the Paul 'floc' tests that were developed specifically for the purpose of detecting under-burned clinker. Many of these tests have been incorporated in purchase specifications for cement, a fact that makes the question of their significance a matter of practical as well as academic importance. In this chapter it is proposed to discuss the available laboratory data on the Long Time Study cements with a view to correlating the results with the field performance of these same cements in concrete that has been exposed to natural weathering for approximately 12 years. In addition to the P.C.A. laboratory, data was made available from the laboratories of the U. S. Bureau of Reclamation, U. S. Bureau of Public Roads, and the New York State Department of Public Works.

After describing the work done in the several different laboratories, Mr. Jackson gave what he called, "A brief summary of the laboratory tests as follows:

"(1) Laboratory freezing and thawing tests of concrete correlate very well with field performance in showing the marked improvement in durability that was obtained by the use of entrained air.

"(2) Laboratory freezing and thawing tests conducted by the U. S. Bureau of Reclamation indicate a fair correlation between the durability of concrete and the computed C_3A content of the non-air-entraining cements, cements of low C_3A being the more durable. Corresponding tests by the Bureau of Public Roads indicate a similar improvement in the case of cements that are low in both computed C_3S and C_3A, that is, the Type IV cements. U.S.B.R. and B.P.R tests seem to correlate fairly well with performance on the New York Test Road where less surface scaling has been observed in sections containing the Type IV cements, and with performance at Naperville where in the case of the lean mix (4½-sack) the boxes made with the Type IV cements show, in general, less deterioration than comparable boxes made with other cements. Neither laboratory series correlates with performance at Cape Cod where there are only very slight indications that durability is affected by cement composition.

"(3) There is no correlation between fineness of cement as measured by either the Wagner turbidimeter or the Blaine air permeability test, and the field performance of the concrete. Cements ranging in fineness (Wagner) from about 1650 sq. cm. per gram to about 2800 sq. cm. per gram having performed in an equally satisfactory manner on all three of the subject projects.

"(4) Autoclave expansion tests of the cements correlate with field performance in concrete only to the extent that Type IV cements have, in general, somewhat lower expansion than the other types; however, there are many exceptions.

"(5) The various types of mortar strength tests, as well as the compressive and flexural strength tests of concrete, reveal considerable differences in the strength characteristics of these cements that, so far, have not been reflected in field performance, either from the standpoint of durability or structural stability.

"(6) Wide difference in the premature stiffening tendencies or in the

Some of the past presidents in attendance with the newly elected president: Raymond E. Davis, 1942; Frank H. Jackson, 1950; Harry F. Thomson, 1951; Chas. S. Whitney, president; Herbert J. Gilkey, 1949; Chas H. Scholer, 1954; and A. T. Goldbeck, 1952

bleeding characteristics of these cements, although affecting placing and finishing operations to a considerable extent, have not, up to the present time, resulted in corresponding differences in the field performance.

"(7) The results of the autoclave test made on clinker from which the Long-Time Study cements were manufactured, show no correlation with field performance.

"(8) Differences in the drying shrinkage of these cements appear to be without significance from the standpoint of field performance."

A concluding statement prepared jointly by Mr. Jackson and Hubert Woods, the Portland Cement Association's director of research, said that only one of the many physical tests made under the original program is of any value in indicating relative resistance to freezing and thawing. That was the test for air content.

"The Long-Time Study has offered the only opportunity to observe under comparable conditions in the field, the frost-resistant characteristics of cements of widely different compositions. The result of these observations, as interpreted in the light of other studies, both in the laboratory and in the field, lead definitely to the conclusion that the inherent low frost resistance of non-air-entrained portland cement paste is not significantly altered by changing the chemical composition of the cement."

European Precast Concrete

A symposium on European Precast Concrete was another feature of the program. Douglas McHenry, P.C.A. director of development said that the symposium was a report on the observations of three men who visited concrete plants and construction projects in England, France, Germany, Belgium and the Scandinavian countries. He said Europeans have made much progress in precast concrete and have opened a field of great potentialities. He said that precast concrete with a compression strength as high as 10,000 p.s.i. had been noted in some European countries.

Dr. Eivind Hognestad, manager of the structural development section of the P.C.A. research and development laboratory, discussed factory-made precast concrete and mentioned the use of concrete for the wings of guided missiles.

Thor Germundsson, manager of the structural and railways bureau of P.C.A. discussed precasting on the job site. All three papers were illustrated with colored slides.

Lightweight Concrete

Four papers on lightweight aggregates and lightweight aggregate concrete were given at one of the sessions, presided over by George W. Washa, associate professor of mechanics, University of Wisconsin. The four papers were in the nature of a report of the work of Committee 213 (A.C.I.), formed in 1946 and three sub-committees. Committee 213 was organized to study Properties of Lightweight Aggregate and Lightweight Concrete. Prof. Washa, chairman of Committee 213, explained that the committee had been given the assignment, "to gather, correlate and report available information on the properties of concrete made with mineral lightweight aggregates in the fields of monolithic structural concrete, precast concrete and insulating and roof and floor fill concrete, with special reference to the following: Unit weight, compressive strength, transverse strength, absorption, permeability, resistance to freezing and thawing action, resistance to high temperatures, volume changes due to moisture variations, and elastic and plastic properties."

Prof. Washa offered the following four conclusions at the end of his paper: (1) lightweight concrete can be made by the addition of air to gas-entraining admixture and/or by the use of lightweight aggregates; (2) the use of mineral lightweight aggregates has increased at a rapid rate during the past decade and every present indication points to a continued increase in the future; (3) lightweight mineral aggregates are available in a wide variety of properties, and final selection of the particular aggregate for a specific purpose is dependent on economic and performance characteristics; and (4) lightweight aggregates are used for lightweight monolithic structural concrete, masonry units, and other precast products, various types of insulating concrete, plaster and fireproofing concrete.

R. W. Kluge, head of the civil engineering department of the University of Florida, Gainesville, was chairman of Subcommittee 1 with Alexander Klein, A. G. Timms, L. H. Tuthill and F. G. Erskine, members. Prof. Kluge gave a paper on "Lightweight Structural Concrete."

Concrete Masonry Units

C. C. Carlson, manager of products and applications development section of the P.C.A. laboratories, presented a paper, entitled "Lightweight Precast Concrete and Masonry Wall Construction," which constituted a report of Sub-Committee 2 of which Mr. Carlson is chairman. Other members of the Sub-Committee are A. G. Streblow, H. T. Williams, and P. M. Woodworth.

The block industry is the largest user of lightweight aggregates of all kinds, Mr. Carlson said. It is estimated that about 15 million cubic yards of lightweight aggregates went into concrete block in 1954. He pointed out that improved insulation and acoustical properties of walls are secured with lightweight aggregate. Regarding grading of aggregates, Mr. Carlson said that grading affects molded units in several ways. The same grading for one, he said, is not necessarily suitable for another type or size of aggregate. The producer, he said, must watch the moisture content of lightweight aggregates. There seems to be a belief that lightweight aggregates must be prewet. Tests with batch mixers, he said, show that mixing time should not be less than 5 min., including prewetting time. Some pressure in molding seems to be essential in making block with lightweight aggregate.

In the matter of curing, Mr. Carlson pointed out that at present the greater number of block manufacturers are steam curing block at atmospheric pressure. A smaller number

are curing with high pressure steam. Drying practices, he said, are being given more attention now."

Mr. Carlson summarized the report of his sub-committee as follows: (1) the importance and value of lightweight aggregate and the manufacture of concrete masonry units is well established; (2) the producers of lightweight aggregates and the manufacturers of concrete masonry units have a responsibility in their respective fields for the maintenance of high quality in the finished product, the concrete masonry unit; (3) laboratory tests and service experience indicate that lightweight aggregates contribute to superior heat and sound insulation and fire resistance in masonry walls; and (4) the performance of concrete masonry wall construction with respect to volume change is affected by climatic environment.

R. C. Valore, Jr., materials engineer of the National Bureau of Standards, Washington, D. C., gave a paper on "Insulating Concrete," as a report of Sub-Committee 3 of which he is chairman. Other members of the sub-committee are: Frank Brown, J. J. Brouk and J. E. Counts.

He pointed out that future research on insulating concretes might consider some of the following subjects: (1) modification of adequate grading requirements; (2) choice of satisfactory test specimen fabrication techniques; (3) choice of satisfactory compressive strength test specimen from standpoint of size and shape; (4) investigations of effect of drying on strength of specimens of different sizes; (5) significance of indentation strength; (6) the wisdom of briquette tensile tests specimens; (7) drying rates in controlled atmosphere; (8) dimensional stability over long periods and its degree of importance; and (9) applicability of cellular concretes.

Pavements and Buildings

A program on concrete pavements, presided over by C. H. Scholer, retiring A.C.I. president, was held concurrently with a session on concrete construction with vice president Frank Kerekes, presiding.

"Prestressed concrete may lead to solutions of some unanswered problems in the paving field," Thomas Cholnoky, of Frederick R. Harris, Inc., New York, told A.C.I. members in his paper on "Prestressed Pavements."

Other papers in the session on pavements were: "Design and Control of Paving Concrete," by R. A. Burmeister, material engineer, City of Milwaukee Testing Laboratory; "Design of Joints for Pavement," by E. E. Finney, research engineer, Michigan State Highway Department; and "Design of Steel Reinforcement for Crack Control of Concrete Pavements," by Bengt F. Friberg, consulting engineer.

Largest Prestressed Tank

J. J. Closner, vice president of the Preload Co., Inc., New York and T. Carlweitz, engineer of B. M. Heede, Inc., New York, described the building of a 2,000,000 gal. elevated tank in the session on "Construction."

The authors said that although more than 700 prestressed concrete underground, surface and elevated tanks have been built in North America, the two million gallon elevated water tank built for the City of Dallas, Texas, represents a milestone in prestressed concrete tank construction. The structure consists of a prestressed concrete tank, 98 ft. 6 in. in diameter, with wall height of 35 ft. resting on a two-foot thick reinforced concrete slab.

Lift Slab Operations

Lift slab operations on a new office building for the Ford Motor Co. at the River Rogue plant, in Dearborn, Mich., was described in detail by B. H. Miller, president of the Skyhook Lift Slab Corp., of Kansas City, Mo. His paper was entitled, "Youtz-Slick Methods of Construction," previously described in ROCK PRODUCTS, May, 1954, p. 139. By this method upper floor and roof slabs are cast on the building's ground floor slab and then lifted into place by hydraulic jacks.

Other features of this session included papers entitled, "Prepakt Concrete Backfill of Alcan Project Penstock and Turbine Pit Liner," and a report on "Problems of Design and Construction of the St. Louis Municipal Airport Terminal."

Woman Wins Wason Medal

When A. C. I. awards were announced by President Scholer at the "Awards Luncheon" on Wednesday noon, it was revealed that for the first time in the history of the Institute a woman was among the recipients. She is Mrs. Katharine Mather, chief of the petrography section, concrete research division, of the Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss. The coveted Wason medal for "noteworthy research," was given to Mrs. Mather and to Thomas B. Kennedy, chief of the concrete division of the Waterways Experiment Station for their paper, "Correlation Between Laboratory Accelerated Freezing and Thawing and Weathering at Treat Island, Maine."

The Wason medal was also awarded to Rudolph C. Valore, Jr., materials engineer, National Bureau of Standards for his paper on "Cellular Concretes," which appeared in the May and June, 1954, A.C.I. journals.

The Henry C. Turner Medal, was awarded posthumously to Roderick B. Young, who prior to his death in August, 1954, was research consultant for the Hydro-Electric Power Commission of Ontario, Toronto, Canada.

Retiring President Scholer also announced the election to honorary membership in the A.C.I. of Frank H. Jackson, engineering consultant, Washington, D. C. and Thomas E. Stanton, formerly materials and research engineer, California division of Highways.

Batching Equipment

A concurrent session on "Construction Equipment," and on "Design and Research," included a paper on "Testing of Batching Controls and Recorders for Concrete Plants," by W. L. Burgess and C. H. Willetts. This paper was a report of a test program sponsored by the Corps of Engineers and conducted during 1953 and 1954 at the concrete division laboratories of the Waterways Experiment Station, Vicksburg, Miss. The purpose was to obtain performance data on commercially available batching controls and recorders for concrete batching plants. Mr. Burgess is from the control branch, engineering division, civil works, Office of the Chief of Engineers, Washington, D. C. Mr. Willets is from the Waterways Experiment Station.

Fourteen manufacturers were invited to submit batching recorders and controls for testing. Equipment was received from the following: Butler Bin Co., Waukesha, Wis.; Hardy Scales Co., Maywood, Calif.; C. S. Johnson Co., Champaign, Ill.; Conveyor Co., Los Angeles, Calif.; the Noble Co., Oakland, Calif.; and the Blaw-Knox Co., Pittsburgh, Penn.

Equipment was installed and tested in a 2-cu. yd. capacity batching plant with overhead storage compartments. This plant permitted cement and water to be individually weighed; the aggregates are cumulatively weighed. Each participating manufacturer was responsible for installing and adjusting his equipment. The equipment was tested only for its accuracy in weighing and recording the cement and fine and coarse aggregates.

Pea gravel, (100 percent passing a ½-in screen) was used to simulate the cement, the fine aggregate, and the coarse aggregate normally contained in the concrete batch.

Not less than 500 batches were produced in testing each piece of equipment. Weight of each ingredient was automatically recorded as it was

(Continued on page 248)

BESSER

★ This is the 117th of a series of ads featuring leaders in the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Don Erickson and his father, O. E. Erickson, President of Glacier Company, are largely responsible for the Company's preminent position in the industry.

Successful Sand & Gravel Company Boosts Profits with VIBRAPACS

Glacier Sand & Gravel Company, Minneapolis, began block making operations in 1927. Ten years later they installed their first Besser K3 Tamper. In 1948, the first VIBRAPAC was installed. This machine was so satisfactory, from a production and profit standpoint, the Company added another Vibrapac Front Pallet Feed Model in 1954.

Don Erickson, Secretary and General Manager of the Glacier Company, states: *"We decided on Besser Vibrapacs as the best equipment for consistent production of high quality block".* Currently, both Vibrapacs are busy producing block for homes, churches, schools and commercial buildings in the Twin City area.

Vibrapacs are preferred by block plant operators everywhere because they produce better block, faster . . . day after day, week after week, with no "downtime". Get the facts from your nearby Besser representative.

BESSER COMPANY • Box 135, Alpena, Mich., U. S. A.

Complete Equipment for Concrete Block Plants

One of two Besser Vibrapacs installed in the Glacier Sand & Gravel Company plant. Produces three 8 x 8 x 16 modular block at a time on one Plain Pallet. Other sizes, in equivalent multiples, on the same Plain Pallet.

Yard scene at the Glacier plant showing stock piles of various types and sizes of block — all made on the Vibrapac machines.

A 8243-1PBC

PREVENTIVE Maintenance In the Ready-Mixed Concrete Industry

30: A producer views the ready-mixed concrete business. This article of series is on tires

By JAS. A. NICHOLSON*

TIRE COST is the largest single expense in ready-mixed concrete maintenance. Replacement cost is only part of the story. Approximately one-third of all road calls originate with tire failures. The installation of an effective tire-care program most certainly means a sharp cutback in the number of road calls. The elimination of one road call removes an avoidable $50 expense charge. Through efficient tire-care routines, tire-caused road calls can be cut in half, representing an annual saving of 15 to 20 percent in road call expense. A fleet of ten tandem mixer trucks has 100 tires; an investment of $12,000 in rolling rubber. Even with a fleet of this size, proper tire-care planning can produce an annual saving of several thousand dollars.

Once you get a greasing program working effectively, a solution to the tire-care program seems to develop naturally. In both cleaning and greasing, the importance of willing, industrious personnel has been stressed. The same holds true for tire-care. The greaser who solved the lubrication problem may become the tire man to put rubber costs under effective control.

Small producers must necessarily depend on one of their own men or upon the service representative of a tire supplier in the development of a tire-care program. As has been pointed out by James Joseph in ROCK PRODUCTS, October, page 81, "Forty Percent More Tire Life After Hiring An Expert," a large fleet operator can make such sizable savings through proper tire-care that he can probably afford to engage the services of a tire efficiency expert. It is also probable that an average size concrete producer can actually insure the installation of an effective tire-care program by insisting upon such a development as a condition precedent to giving all his tire business to one dependable supplier.

Operating costs remain high when the wrong tires are purchased, narrow base rims are used, tires are not properly inflated, dual tires are mis-matched, damaged tires are not promptly repaired, mechanical defects (on trucks) run rampant, trucks are overloaded, speeding is accepted practice and no one cares about job conditions, tire performance and cost records.

Tire replacement costs and breakdown charges are brought under closer control by buying the right tires for the job, setting up a systematic tire inflation checking schedule, carrying out an effective rotation policy, properly matching dual tires, having spares ready for quick mounting, making regular inspections, repairing and recapping on time, correcting mechanical defects on trucks before tires are damaged and backing up these sound operating practices through the use of an efficient record control system.

In buying rubber for mixer trucks, tires should be bought that will easily carry the loads, resist scuffing and cutting, aid steering, provide plenty of traction and give long operating life. Top considerations are operating life and traction qualities. Our No. 1 problem on tire selection is to buy rubber that will provide sufficient traction to get trucks into jobs. On much of the work, mixer trucks encounter tough ground conditions. Rough and tough tire treads, of the road lug type, have to be on the drive wheels, if the trucks are to get where they are needed. Few contractors provide decent approaches for deliveries. Snags, cuts and bruises so ruin tires that removal is necessary and recapping impossible.

"Off the road" hauling is the industry's main trouble causer.

Tire Care Pays Dividends

In protecting an investment in tires, the establishment of systematic inflation routines and the avoidance of overloading are of special significance. Recommended inflation pressures should be carefully maintained. Variations exceeding 5 lb. should not be tolerated. Underinflation causes added flexing and increasing heating, leading to faster wear and blow-outs. Over-inflation puts an unnecessary strain upon the tire, produces faster wear on the center of the tread and increases the possibility of bruising and cutting. Overloading means faster wear, shorter life, more blow-outs and additional downtime. A producer overloading by 20 percent, probably knocks as much as 40 percent off anticipated tire life.

The time to buy tires is in the winter and near the end of the operating year. Tires need to be broken in. Tires tempered in service before hot weather arrives seem to last longer. Probably, the wearing of some of the tread, reduces the heating problem. Get new tires working while weather conditions are favorable. Only in emergency, install new tires in hot weather. Although this article is on maintenance, it would seem this is the place to point out that, taxwise, it might be advantageous to purchase a number of tires before the fiscal year of a profitable operation comes to an end.

Recent trends in expanding mixer load capacities call for putting 14,000 lb. or more on the front axle. Keep this in mind — American built tires of the size used on mixer trucks have a maximum rating around 5000 lb. each. To place more than 11,000 lb. weight up front, is dubious practice. Before agreeing to any substantial overload of tires, talk to your supplier and get his written approval.

A number of producers who are using power steering and loading their trucks so that 14,000 lb. or more are being put on the front axle, are intelligently cushioning their risk by purchasing French manufactured tires (50 percent higher cost) that are definitely made to handle higher capacity loads. Several American tire manufacturers also have introduced a new line of tires to handle this problem.

An employe (or any other person) given the job of tire-care is responsible for making certain that wide base rims are used, tires are properly mounted, there is sufficient overhead clearance between tire and truck, dual tires are so spaced that no touching occurs when tires are deflated under maximum load, hand holes are in line (to reach the inside tire's valve), tires are placed in accordance with planned rotation policy and the tires on dual assemblies are most carefully matched.

Truck tires work best on wide base rims. The use of narrow rims means mileage loss through cramping, great-

(Continued on page 241)

*Pres. Nicholson Concrete Co., Toledo, Ohio

Jones COMPRESSION TESTING MACHINE

for more economical mixes, and uniformly higher strength

By doing your own testing of concrete blocks and cylinders, you will immediately discover anything which may have gone wrong with the aggregate, grading, mixing, etc. This will help you maintain more uniform quality and develop more economical mixes. The Jones (formerly Yoder) testing machine is low in first cost, specially designed for concrete products plants.

Send for list of satisfied users and literature.

J. A. Jones CONCRETE MACHINERY
100 Horning Road, Pittsburgh 34, Pennsylvania

PUT CANCER ON THE DEFENSIVE

together we can strike back

Give to

AMERICAN CANCER SOCIETY

Waterproofing Concrete Masonry

A UNIQUE FEATURE at the recent National Concrete Masonry Association convention was a "Paint and Waterproofing Panel" with E. A. Peterson serving as moderator. Panel members were Harold Lutes, Spokane, Wash.; Hugo Quillian, Daytona Beach, Fla.; E. E. Osborne, Wilmington, Ohio; and C. N. Heath, Johnson City, Tenn.

Mr. Quillian covered the subjects of wall leaks, flashing, downspouts, mortar cracks, structural cracks, unfilled nail holes, thermal changes, etc., in their effects on performance of concrete masonry. A good job of waterproofing, he said, begins with proper design of a structure to prevent water penetration. Thin mortar joints are best, in his experience, and the concave type is preferred. Good workmanship to insure proper bond between the mortar and units is essential and the mortar should have good water retentivity when dry block are used. Haste in building is responsible for much of the poor workmanship said Mr. Quillian.

Masonry paints are widely used in Florida, he said, and practice is common to apply stucco over masonry walls. Possibly 40 percent of the walls have cement base paints and metallic oxides are used for color. These coatings are hard, strong, brittle and have good durability. A 2-coat brush application breathes well according to experience. Twenty percent of the walls have liquid rubber-base paints and their use is increasing. They have good resistance to weathering and the colors hold well. Some 20 percent of cement stucco surfaces have oil-type paints, and 10 percent are of water emulsion paints which yield an elastic film. Ten percent are ordinary whitewash coatings of cement and water. Silicone-type coatings are used to a limited degree thusfar.

Mr. Osborne stressed the importance of waterproofing walls *after* they are laid and for checking for cracks and adequate curing before application of surface coatings. The use of bituminous material, of either the hot or cold type, is advocated for below grade treatment. Every pore should be adequately covered. Practice with some is to apply a cement whitewash first to be followed by a tar application after proper curing. For backup walls, the use of properly located weep holes just above grade is recommended.

Mr. Osborne's company manufactures a white-colored unit from limestone aggregate and so prefers transparent coatings of the silicone type. Some oil-base paints are used as well as the rubber-base type. A new type plastic coating is coming into use.

Mr. Heath stressed the need for ventilating closed buildings like churches and schools, where concrete masonry is used for interior walls in order that they cure properly. He suggested that salesmen be properly trained so that they will be able to suggest correct practices for water-proofing.

Mr. Lutes told of a test program at Washington State College to evaluate commercial exterior coatings as applied on pumice units. Some 74 coatings have been subjected to accelerated test procedure and the conclusion reached thusfar is that accelerated methods serve to rule out the unsuitable types. Cement base and heavy oil types of coatings have proved best. Transparent coatings containing silicone solids up to 6½ percent have proved excellent.

Autoclave Panel

AT A PANEL DISCUSSION on High Pressure Curing, Chairman Wilson outlined the program.

In the last two years, at least 18 producers have started high pressure steam curing or purchased the necessary equipment, said Mr. Wilson, and others are contemplating the step. Many of the questions were elementary and concerned the reaction between pozzolans and free lime from the cement. Mr. Selden explained that the reaction results in mono-calcium silicates thereby giving an added cementing value.

According to Mr. Ferguson, shrinkage of autoclaved units is of the order of 50-66 percent less than for normal high temperature, low pressure cured units, and moisture contained might be in the range of 10 to 18 percent. Opinion is that normally cured block, if dried sufficiently at 300 deg. F., might approach the low shrinkage of autoclaved units but will not approach comparable strength. The question is whether such shrinkage reduction would be permanent.

All members of the panel but one said that they did not receive premium prices for autoclave units. The exception is a premium of one cent per unit. In answer to a question as to savings from the use of pozzolans to replace cement, Mr. Selden said that that depends upon the particular pozzolan and the aggregate used. Optimum results might obtain from replacements of cement from 10 percent all the way to 50 percent. He said the savings normally would be from one to two cents per unit.

(Continued on page 241)

AMERICA'S FASTEST-GROWING BUILDING MATERIAL...
ECONOMICAL...MAINTENANCE-FREE

J. Rich Steers' casting bed used for fabricating Pier C deck members.

THE PRODUCTION of precast concrete members prestressed with 7-wire stress-relieved strands pre-tensioned and bonded has grown enormously in the past two years. Starting virtually at scratch, millions of square feet of bridge deck and floors and roofs for buildings are now being produced... part of it in the thirty odd universal casting beds scattered across the country... another part in the special beds set up for individual structures such as:

200,000 sq. ft. of heavy deck for Pier C in Hoboken, N. J.;

24 miles of 56-ft. span sections for Lake Pontchartrain in Louisiana;

9,400 feet of 50-ft. span sections for bridge-tunnel crossing at Hampton Roads, Va.

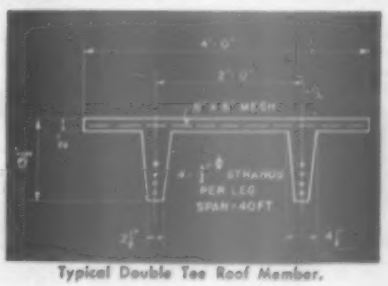
A big reason for this growth is lower cost compared with other materials and with other methods of prestressing concrete. Another is the development by Roebling of stress-relieved 7-wire strand for pre-tensioned bonded work.

7-wire strand provides about 50% greater surface area for bond than single wires of the same strength. It also provides added mechanical bond as the concrete sets in the valleys between the outside wires.

Stress-relieving the strand raises the yield strength of the steel and produces a more pliable unit. This has made possible the use of still larger units and higher initial stresses with attendant economies in both material and labor costs.

Since its development, Roebling has fabricated millions of feet of 7-wire stress-relieved strand and is ready to meet today's demand. Write us for brochure explaining pre-tensioned bonded prestressed concrete and for answers to any particular questions. Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

Double Tee casting bed at Duracrete, Inc., Leesburg, Florida. Besides universal beds for fabricating all type members, some plants have beds like that shown here to handle the steady volume of double tees.



Typical Double Tee Roof Member.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

FOR GRINDING AGGREGATE

YOU CAN'T BEAT

HUBER WARCO

GRINDERS

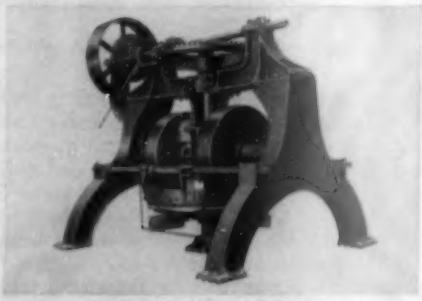
30 YARDS PER HOUR CAPACITY

The Huber-Warco No. 9A Grinder has been designed to give big-volume aggregate production with a minimum of grinding costs. Profits go up with this high capacity machine, and maintenance costs go down because it is relatively service free.

This machine will grind cinders wet or dry, and will give the capacity you want. The suspended yoke mounted mullers are adjustable to any height, and for finer grinding, the grinding surfaces run together.

Because of the low power consumption requirement, the Huber-Warco No. 9A Grinder will greatly reduce power costs. All gears are long-wearing cut-steel, and operate in a bath of oil.

Other Huber-Warco Grinders range in capacity 4 to 75 yards per hour. Whatever your capacity requirement, there's a Huber-Warco Grinder exactly suited to your type of aggregate.



No. 9-A RIM DISCHARGE GRINDER

The weight of the machine is 31,000 pounds. Horsepower is 25 H.P. Floor space required is 12' 8" x 11' 2" with a height from base line to center of driving shaft of 8' 11".

LOOK TO HUBER-WARCO FOR GRINDING

- **CINDERS**
- **HAYDITE**
- **PUMICE**
- **SLAG**

AND QUARRY AND MINE PRODUCTS

If accurate grinding, in volume, poses a problem in your plant . . . ask for a non-obligating consultation with the Huber-Warco grinding specialist . . . write, wire or phone.

HUBER WARCO

HUBER-WARCO COMPANY

MARION, OHIO, U. S. A.

Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

Autoclave Panel

(Continued from page 238)

One panelist reported a saving better than one cent per unit or $70,000 per year, basing his figures on a cost of one cent per lb. for cement and one-half cent for siliceous material. His replacement is 40 percent of silica. As to two-phase curing, a producer who has tried it reported it to be too expensive. He observed discoloration in the units and a high percentage of culls in handling after autoclaving. Another producer said that units cured first under low pressure steam must have sufficient moisture retained to complete the reaction in autoclaves. In another case it was reported that normally cured units taken in from the yard and autoclaved after soaking gave identical results to units autoclaved as they come from the machines.

Still another producer, who has used the 2-phase system, reported excellent results. He cures the units first for 8 hr. under low pressure steam and uses volcanic cinders and pumice as the source of siliceous material. In his opinion, the probable feasibility of the process depends on economical handling methods. He reported no loss of strength or increase in brittleness. Too rapid a buildup of temperature in the autoclave will increase brittleness.

A point that was brought out is that it is just as important that autoclaved units be dry when laid in walls as it is for normally cured units.

There was much interest in comparative curing costs for autoclaving and normal low pressure steam curing. One producer reported a direct cost increase over low pressure curing of 1.4 cents per unit including light, heat, power, the cost of a boiler operator and amortization of the equipment over eight years. This is about balanced by the savings in cement. The cost for high-temperature, low pressure curing was ¾ cent per block at this plant. As to costs for equipment, Mr. Selden said that they will become more favorable as the demand increases.

Whiter Block

BUILDERS SUPPLY CORP., Phoenix, Ariz., reportedly is producing a relatively white block by the addition of diatomaceous earth to its perlite aggregate. The diatomaceous-perlite block reflect more sunlight and are also said to be more moisture-repellent than conventional perlite block. Builders Supply Corp. reportedly has found such a welcome acceptance of its new product that it is enlarging its experimental plant to produce 30 tons of diatomite per month.

Bantam®

DOES IT AGAIN!

Announcing . . .

2 NEW, IMPROVED BANTAMS
C-35 A and T-35 A

At No Increase In Price!

OPERATE THEM . . . You'll *feel* the difference

MODEL C-35A CRAWLER

LOWEST PRICED CRAWLER in the industry! Features 2-speed independent travel . . . 2½ p.s.i. bearing pressure with 32" pads . . . 94" overall width with standard pads for fast job-to-job moves without special travel permits — extended frame available for ditch straddling.

MODEL T-35A CRANE-CARRIER MOUNTED

We're Carrier Specialists, too, with a complete line-up to meet your job needs! Model 100 All New 6 x 4 Bantam Built Carrier, Model 200 GMC 6 x 6 Crane Carrier, or Model 300 Heavy Duty International 6 x 6 Crane Carrier . . . Just Announced!

HERE'S THE INSIDE STORY OF BANTAM'S SUPERIORITY

IT GIVES YOU . . .

MORE POWER

6 cyl. instead of 4, more horsepower, more torque, smoother, quieter operation!

SMOOTHER OPERATION

NEW 2-SHOE SWING CLUTCH — Smoother operating, longer drum and lining life, easier to adjust!

POWER UP & DOWN BOOM HOIST — (standard) Lets operator handle loads safely — accurately.

ANTI-FRICTION BEARINGS — Faster operation with less maintenance.

NEW BALL BEARING BEVEL GEAR MOUNTING — Takes both radial and thrust loads.

NEW PLATE LOCK — Enables operator to operate and lock each lock dog lever independently!

LONGER LIFE

REVOLUTIONARY NEW DRIVE TUMBLERS! New patented design provides constant rolling contact between tumbler & shoe to increase tumbler & track lug life!

NEW HOOK ROLLER DESIGN (Optional) — provides 4 rear hook rollers — spreads machine load over greater surface area, relieving strain on any portion of roller path.

NEW RING BULL GEAR — Teeth flame hardened for longer wear!

NEW VERTICAL DRIVE GEAR — features flame hardened bevel gear teeth for longer life!

NEW TRUNNION BASE ROLLER PATH — flame hardened for greater strength and longer life.

NEW HEAVY DUTY VERTICAL SWING SHAFT

NEW STRONGER TRAVEL CLUTCH SHAFT

Write TODAY for complete information on these great, new Bantams. RP-8

JOB-PROVED OVER 5800 BUILT AND SOLD

WORLD'S LARGEST PRODUCERS OF TRUCK-CRANES AND EXCAVATORS

SCHIELD Bantam Co.

216 PARK ST. — WAVERLY, IOWA, U.S.A.

Besser Automatic Vibrapac

Gives You MORE!

The growth of the concrete block industry coincides with the growth of the Besser Manufacturing Company. 50 years ago, Besser made the first concrete block machine. Since then, the company has devoted its constant and untiring efforts to producing better block machines, pioneering new types and improving production methods. Today — the Automatic Vibrapac is the result of that half-century of pioneering and developing. The machine gives you MORE . . . more power, more smoothness, more ruggedness, and, what every block plant operator is primarily interested in, more block production. No doubt about it — the Automatic Vibrapac is the world's leading concrete block machine — a PROFIT MAKER for block plants everywhere.

BESSER MANUFACTURING CO. • Box 135 • Alpena, Mich., U.S.A.

MORE power

The Automatic Vibrapac provides unidirectional vibration from two 10 horsepower, high starting torque vibrating motors — DOUBLE the horsepower of any other block machine.

MORE production

The famous Besser cam and roller principle assures maximum block production. The slow revolving cam, with a roller riding on its surface, delivers power with pin point precision and with steady, uninterrupted regularity.

MORE smoothness

The Vibrapac is equipped with gravity actuated block moving weights which assure much smoother delivery of the finished block at high speeds.

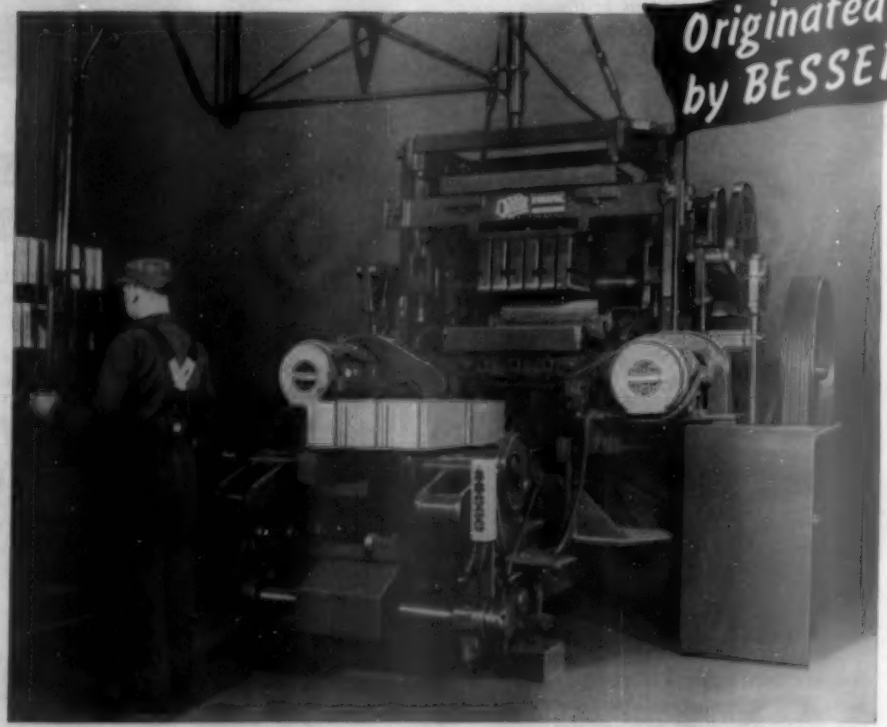
MORE ruggedness

The machine frame of the all-steel electrically welded Vibrapac is made of 1½" thick steel—almost unbelievable, but it's a fact. That's why the Vibrapac is able to produce block, day-in and day-out, without interruption — for YEARS.

Watch VIBRAPACS Work

Step into any Vibrapac block plant and see high quality block made, automatically. Notice there are no lost motions and no time is wasted. Pallets and mixed materials are fed automatically. As block are completed, they are quickly transferred to the racks. No manual lifting. Off-bearer merely guides the power hoist.

Vibrapacs are versatile. They make ALL types and sizes of high-quality masonry units on ONE set of Plain Pallets. Vibrapac Block are specified by progressive architects — used by leading contractors—produced and sold by leading concrete products plants.



Your profits depend largely on the uninterrupted production of high quality masonry units. The Automatic Vibrapac enables you to reach this goal. It produces block of exact height and uniform density on a continuous production line. Three 8"x8"x16" modular units (or equivalent in other sizes) are made at a time on one Plain Pallet. No machine operator is required.

BESSER
50th Anniversary
1904-1954

A Half Century of Concrete Masonry Progress!

Preventive Maintenance

(Continued from page 237)

er heating, added scuffing and increased flexing. Changing to wide base rims assures longer tire life, less chafing, fewer bead failures, improved steering and more freedom from side sway.

It is common practice of the trucking industry to put new tires on the front wheels, then rotate this rubber to rear driving assemblies when approximately one-third of expected mileage is gone. Many producers oppose such positioning practices on trucks used in ready-mixed concrete deliveries. They feel that tires placed on drive wheels should be of the road-lug type — all new or freshly recapped. They don't feel that this type of tire ever belongs on front wheels except possibly on an all-wheel drive mixer truck.

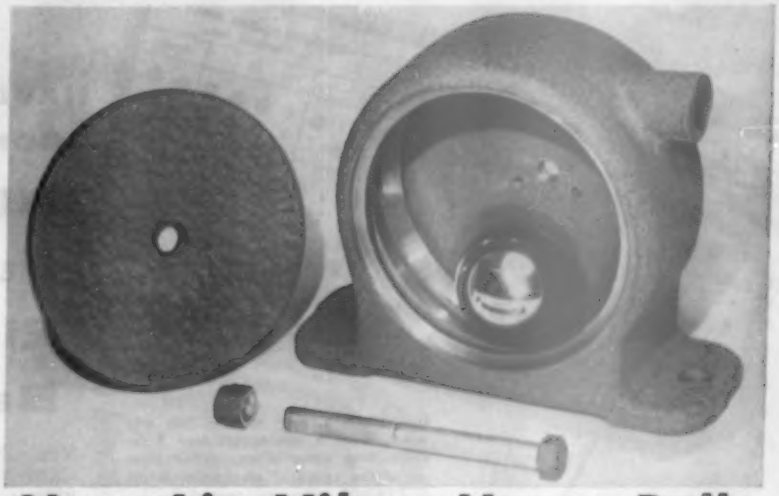
It is extremely important to carefully match any dual assembly tires, new, recapped or partially worn. It is equally important to intermittently move all worn skid tires from one wheel position to another in order to prevent uneven wear. Systematic rotating and efficient matching pay big dividends.

When tires on dual assemblies are mis-matched, both tires take a beating. Unless rolling circumferences of the two tires are approximately the same, there will be poor load distribution. If one tire is substantially larger and has to carry the load, trouble is certain. On paired rubber of sizes used by ready-mixed concrete producers, tire circumferences should not vary more than 1½ in.; tire tread heights should vary less than ½ in. If one of the two tires to be matched is somewhat larger or has a slightly higher tread, it should be placed on the outside dual.

On dual assemblies in addition to matching tires of the same tread height and rolling circumference, it is good thinking to have both tires of the same make. Tires of different makes flex differently. Tires produced by one manufacturer may be slightly undersized; they may vary in tire growth. If reciprocity requires purchase of tires from several sources it will pay to use the stray brands on the front wheels. Insist that your tire man use tires of the same make in matching dual assemblies.

Whenever possible, tire measuring and matching should be done while the tires are unmounted by running a steel tape around the center tread of a properly inflated tire to get exact measurement. When tires are mounted on trucks, checks on matching conditions can be aided through the use of a square or "matching cord" assembly

(Continued on page 245)



New AiroViber Moves Bulk Materials Quickly, Quietly, and Effectively...

AiroViber simple design provides dependable, trouble-free vibration

This new method of external vibration can be used to good advantage in loading, unloading, moving, packaging, processing, grading or separating bulk materials.

The AiroViber is able to deliver effective and dependable vibration with only one moving part, a heavy steel ball running on a circular track. The pounding usually associated with ordinary types of vibration has been eliminated with the special noise lessening design, exclusive with AiroViber.

Simplified Design

AiroViber's one moving part is a steel ball. An air jet blows it at high speed around a ground and hardened steel track in the housing. The weight of the ball develops a strong centrifugal force, which the vibrator transmits through its mounting into the object to be vibrated. It will start and operate under any condition and performs at high or low temperatures. AiroViber is not affected by humidity.

Trouble-Free Operation

The AiroViber is almost fool proof in operation. Because it has no close fitting parts to lubricate or adjust, it will start every time you open the air valve. You can install it in hard to get at locations with full confidence that it will operate without lubrication or maintenance for a long time.

No Installation Problems

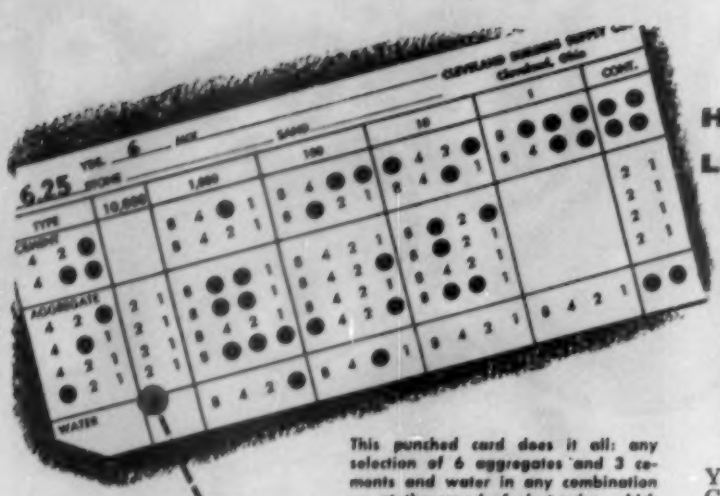
AiroViber is easy to install. It does not need any special line oilers or air filters. Merely hook up an air hose large enough to deliver the air specified for the unit you select.

AiroViber rotary vibration breaks up arching and jamming in bins, hoppers, chutes, feeders, and other places where bulk materials hang up. It is also recommended for vibrating tables or platforms, sorting and many other applications.

AiroViber is a product of Viber Company, leader in the field of vibration. For further information, write: Viber Company, Dept. CO 71, 726 South Flower St., Burbank, Calif.

VIBER

CONCRETE VIBRATORS SINCE 1931



This punched card does it all: any selection of 6 aggregates and 3 cements and water in any combination — at the speed of electronics, which is 186,000 miles per second.

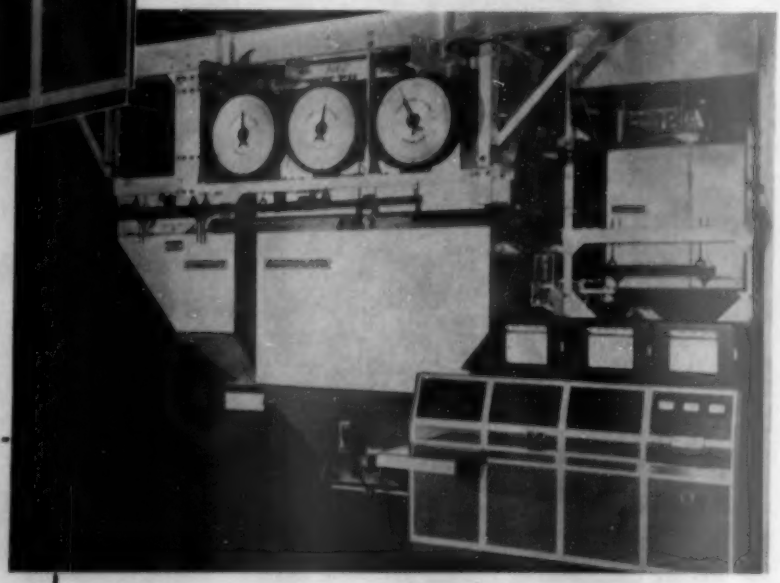
HAVE YOU LOOKED INTO THE BUTLER XK-1 Punched Card Electronic Batcher?

You should, because BUTLER Punched Card Batching is changing production-planning in the Ready-Mixed Concrete Industry. BUTLER Punched Card Batching is of *immediate* importance, for the equipment *can be installed on any existing Ready Mixed Plant* — no matter who the manufacturer.

And the BUTLER XK-1 is of *immediate* importance because of absolute quality-control. The Ready Mixed operator who converts to BUTLER Punched Card Batching has an enormous competitive advantage. The BUTLER XK-1 takes the costly human element out of batching. That alone carries a powerful selling impact for *your* concrete.

But just as important is the cost-saving *simplification* of paper work for your organization.

The punched card is a legal, permanent, finger-tip file-record which can be re-used tomorrow or a year from now. Invoices can be typed from the card — or with auxiliary bookkeeping, equipment, accounting can be wholly automatic. And your dispatcher can also be your batcher.



Write BUTLER BIN Company

or ask your BUTLER distributor for full details. Use the coupon below, 'phone or send a postcard. But do it now to get the advantage of the BUTLER XK-1 in your market.

BUTLER BIN CO.
993 Blackstone Ave.
Waukesha, Wis.

Please send me complete description and specifications of the BUTLER XK-1 Punched Card Batcher

Name .....

Company .....

Street .....

City ..... State .....

BUTLER BIN COMPANY

993 BLACKSTONE AVE. • WAUKESHA, WISCONSIN

in determining tread variations.

After tires have been properly positioned and matched, careful checks should be made at regular intervals on such conditions as wear, bruises, cuts, separation, tire growth and air pressure. Excessive wear will quickly develop unless mechanical defects of the trucking equipment are promptly corrected. These mechanical irregularities include faulty wheel alignment, grabbing brakes, sprung or twisted frame, bent axle, worn bushings, loose U bolts and broken springs. Checking the tires of a vehicle may tell a story about the operating condition of the truck and qualifications of the driver.

When to Recap

Repairs and recapping are important phases of a tire-care program. A neglected cut may mean a tread separation, greatly limiting the life of the tire. Damaged tires, that have been replaced, should be properly repaired at the earliest opportunity. At the end of each day any truck that has had a tire replaced on a dual assembly should be inspected by the tire-care employe to ascertain that all dual tires are correctly matched and positioned.

No ready-mixed concrete producer can afford to overlook the many great advantages of recapping. Recapping, at the cost of a comparatively few dollars, can appreciably increase, even double the life of a tire. Recapping is an effective way to get better traction and lower costs. For a tire to be rehabilitated through recapping, its carcass must be in sound condition. Several years ago, 15 of our replaced truck tires were examined for recapping. All except one of them were reported unfit. Had these tires received proper care from the beginning, practically all of them could have been recapped.

It is quite a jolt to be told by a recapping expert that only one tire out of 15 is retreadable, that all other tires with approximately two-thirds of original tread remaining have been neglected beyond saving. This is the kind of an incident that drives home the importance of preventive maintenance.

Tire treads should be regularly studied for wear. It is important to remove tires for recapping at the right time. It is also important to protect the casings of all tires against abuse of any kind. Through proper tire-care, practically all tire casings can be kept in acceptable condition for recapping. Tire-care should make it possible to recap a number of tires several times.

As with other phases of preventive maintenance, talk is easy; getting the job done is another matter. Placing

(Continued on page 247)

W. E. BECK & SON
Material Contractors
SAND, GRAVEL AND STONE
376 S. 4TH STREET • PHONE 136Y
ALTAMONT, ILL.
Fleming Manufacturing Company
400 Fleming Avenue
Cuba, Missouri
Gentlemen:
The other day a man visited our plant and asked about our new FMC-180. I told him we were 100% satisfied and find that we have doubled our production and lowered our labor cost one-third, thanks to the FMC-180. We think it is a fine piece of equipment and better than any other that we have used.
Just thought you would like to know about this.
Sincerely yours,
W. E. Beck and Son

MR. W. E. BECK
W. E. Beck & Son
Altamont, Illinois

...doubled production,
lowered production cost by ⅓,
thanks to the **FMC-180"**

AUTOMATIC CONCRETE BLOCK MACHINE

Just as with Mr. Beck, the FMC-180 has been the answer to higher profits, lower production costs, for block producers throughout the nation. It'll pay you to investigate.

MAIL THE COUPON TODAY!

MAIL TODAY!

FLEMING

MANUFACTURING CO.
487 FLEMING AVE.
CUBA, MO.
PHONE: CUBA 400

Gentlemen: Please rush complete information, including specifications, prices and terms on the low-priced, fully-automatic FMC-180 concrete block machine.

Also request information on:

☐ Automatic Double Block Machine
☐ FMC Stationary Mixers
☐ Flem-Stone Automatic Block Splitter CP

Name_____
Firm_____
Address_____
City_____ Zone____ State____

GREATER READER SERVICE MAKES ROCK PRODUCTS THE FAVORITE PUBLICATION OF YOUR INDUSTRY

Over 17,000 men in the industry subscribe to Rock Products.

Why? . . . Because Rock Products helps these men, month by month, do a better, more economical, more profitable job. Such regular features as *Hints and Helps, Association News, News of the Industry,* as well as complete, full-length features on the industry's newest, most modern plants make Rock Products the favorite of the industry . . . every month.

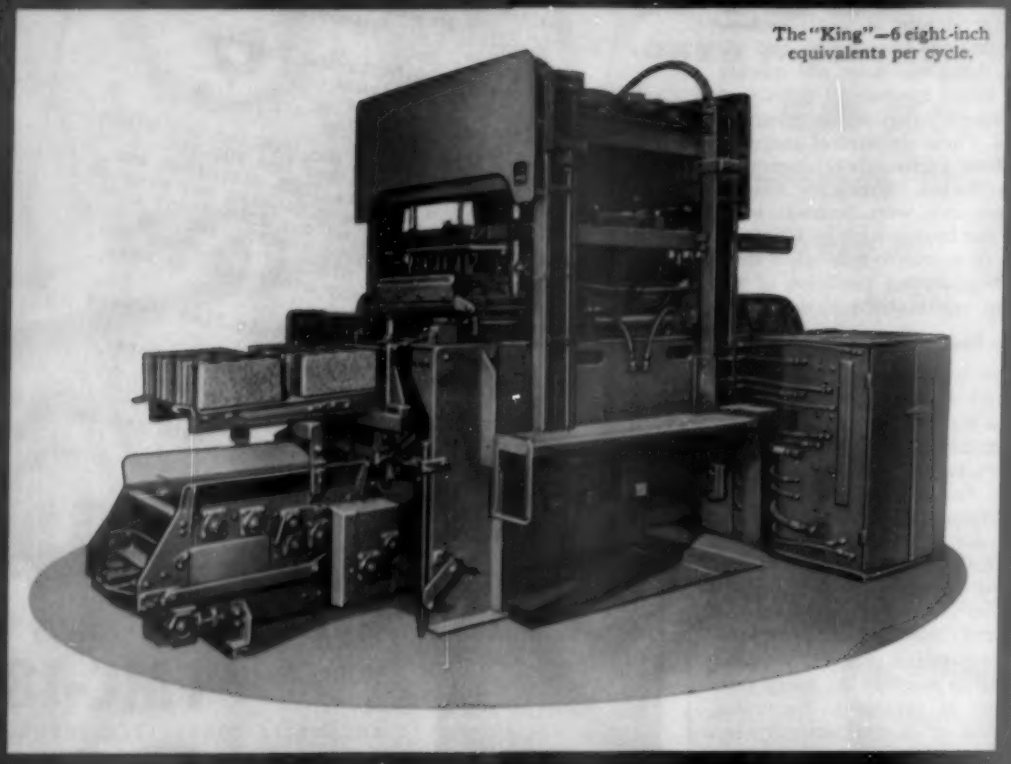
Join this family of progressive, industry leaders today by sending your subscription order . . .

Two years, $3
One year, $2

Rock Products

309 West Jackson Blvd.
Chicago 6, Ill.

USE LESS CEMENT WITH A GOCORP "KING"



The "King"—6 eight-inch equivalents per cycle.

. . . BECAUSE IT PACKS BETTER

FACT – A prominent producer operates a GOCORP "King" and a popular competitive machine. Frequent testing is routine in this plant . . . they insist on top quality. Blocks from the "King" run consistently higher in strength – yet they contain 10% less cement. What is 10% of *YOUR* annual cement bill???

FACT – A GOCORP "King" Packs Better – Pallet is clamped to the mold and the two vibrate as a unit • *Exclusive "Resonance" vibration gives intense directional motion – whiplike change of direction.

FACT – Longer Packing Time With a "King"– The smooth unhurried motions of this hydraulic machine, at 20 blocks per minute, allow a full 11 seconds of intense packing for each block. To get comparable quality and packing time on an ordinary machine, output must be cut 40%.

PLUS – Sequence operation – for easier adjustments and greater production • Under Machine Pallet Return – saves space and time • Hydraulic Drive – smooth effortless performance, far less wearing parts, less down time, less maintenance, *lower unit costs* • Factory Trained Service Men.

AUTOMATION – Certainly!! For the ultimate in high production, high quality and low unit cost – it's the "King" plus RACKMAN (GOCORP'S revolutionary automatic rack loading device).

*Write for your copy of folder "GOCORP PLAIN PALLET MACHINES" which explains the features of the GOCORP "Senior" and "King"

GO CORP
ADRIAN-MICH.
401 GRACE ST. • PHONE COLFAX 5-7155

Preventive Maintenance

(Continued from page 245)

responsibility is the first step. The authority can be delegated to a capable employe, a service representative of your tire supplier, or an outside tire expert.

The next step is an initial inspection and complete appraisal of all tires — truck mounted, on spares and in inventory. To do this job properly, a tire control system (select one from suggestions offered by principal tire manufacturers) should be set up coupled with the aid of a competent tire man to assist with appraisal. The original report should give a complete listing of all tires (sizes, numbers and makes), descriptions of each tire's condition, location of each tire and any suggestions as to replacement, rotation, repair, or recapping. A tire mileage card should be made out for each tire. A vehicle record card should be made out for each truck. Some form of perpetual inventory should be adopted. Each and every tire should be branded with company designation and date of beginning use.

A further move is to forcibly acquaint all drivers with their parts in the tire-care program. Daily checking on inflation pressure, tire lugs, mismatching, and simple mechanical defects should be stressed. This is a good time to hold a driver's meeting to discuss driver participation in an over-all preventive maintenance program. If driver cooperation isn't what it should be, the possibility of an incentive program should be considered. Driver interest is the key to fewer breakdowns and lower maintenance costs.

After initial appraisal, a tire change card should be used in conjunction with every mounting, change of position, replacement, discarding, repair or recapping. This information should be copied down on the control cards. The tire change card should not be handed in until the tire-care employe is satisfied that the replacing tire is correctly positioned and matched.

Every two weeks, all tires in use should be carefully inspected. All changes should be noted; any mismatches corrected. Recommendations should be described. Suggestions for improvement should be spelled out. Each bi-weekly report should be another stepping stone to a better day of tire performance. At year end, effective tire-care practices should be reflected in more freedom from breakdowns, fewer road calls, reduced tire investment and lower operating costs.

It pays to invest in an effective tire-care program. There is a satisfactory tire-care program that each and every ready-mixed concrete producer can easily and successfully install.

ARE YOU PROFITING BY THE SALE OF LINTELS AND SILLS ?

If you are not, it may be because you are not fully familiar with the new and effective way of producing these wanted parts on the

KENT LINTELATOR

With this machine, of which hundreds are already in use, you can expand your sales and profits without increasing your sales force.

Once the availability of machine-made lintels and sills is made known, builders buy them readily as their quality and desirability is immediately apparent.

Why should builders purchase more expensive steel lintels to be installed only by steel erectors when they can obtain reinforced concrete lintels that their own masons install without delay at much less expense?

Why also should you delay looking into the promising possibilities of this machine which eventually will be found in every block plant?

The KENT MACHINE COMPANY
CUYAHOGA FALLS, OHIO
CONCRETE PRODUCTS MACHINERY SINCE 1925

ROCK PRODUCTS
THE
Recognized Authority
OF THE
Non-Metallic
Minerals Industry

COMPLETE PLANTS
from a Single Source

- "Tilt-Up" Mixers
- Ready-Mix Plants
- Expressway Semi-Portable Plants
- Dry Batch Plants
- Cement Bins
- Aggregate Bins
- Cement Storage

ENGINEERED TO WORK TOGETHER

From conveyor to elevator, from bin to mixer Burmeister equipment is designed and built by the same organization. Because each product is *"engineered to work together"* you are assured less costly "conversions," maximum production speed, accurate delivery of materials, and greater economy of operation. See your nearest Burmeister Distributor or write for details.

FREE CATALOG

Send for new 16-page illustrated Catalog of Burmeister Plants and Equipment.

COMPLETE PLANTS FROM A SINGLE SOURCE

Burmeister

L. BURMEISTER CO., 4529 W. MITCHELL ST., MILWAUKEE 14, WISCONSIN

Precision Devices, Inc. Congratulates the Pre-Stressed Concrete Institute on their First Annual Convention

YOUR KEY TO
POSITIVE ANCHORAGE IN CONCRETE

PERMANENT RUST PROOF THREADED SOCKET

SEE YOUR BLD'G. MATERIAL SUPPLIER OR WRITE TO:

PRECISION DEVICES, INC.

142 LIBERTY ST. N. Y. 6, N. Y.

A.C.I. Meeting

(Continued from page 235)

batched. One ingredient or group of ingredients was selected from every fifth batch for independent weighing to check the accuracy of batching controls and recorders.

In summarizing the results of the tests the authors said: "The equipment was tested in a cumulative weighing type of plant. However, all equipment tested is considered satisfactorily adapted to either a cumulative weighing type of plant or an individual weighing type of plant.

"All equipment tested provide a satisfactory interlock to prevent a batching cycle from being started before all batchers are empty.

"All equipment tested provide satisfactory indicating devices, either in the form of a springless dial which indicates scale loads at all stages of the weighing operation or in the form of an over-under indicator which shows the scale in balance at zero load and at any beam setting."

In a paper entitled "More Efficient Concrete Manufacture," Glenway Maxon, consulting engineer, Milwaukee, emphasized the fact that the art of mixing starts with the efficient handling of materials. He discussed mixing and concrete mixers with the idea of producing quality concrete with greater economy.

The closing day of the convention, was devoted to industrial plant visits. Tours included the Allis-Chalmers Mfg. Co., Chain Belt Co., A. O. Smith Corp., and T. L. Smith Co.

New President

Announcement of the election of Charles S. Whitney, as A.C.I. President for 1955 was made at the Awards Luncheon on Wednesday. Mr. Whitney is a partner in the consulting engineering firm of Ammann & Whitney, of New York and Milwaukee. He succeeds Prof. C. H. Scholer, head, department of applied mechanics, Kansas State College, Manhattan, Kan.

Walter H. Price, head of the Denver laboratories of the U. S. Bureau of Reclamation, was elected vice president for a two-year term. Frank Kerekes of the Michigan College of Mining and Technology, Houghton, Mich., who was elected in 1954 for a two year term as vice-president, continues in that office.

Dr. A. Allan Bates, vice-president for research and development of P.C.A., was toastmaster at the annual banquet. Guest speaker was Harry C. Brockel, Municipal Port Director, City of Milwaukee. He spoke on "The Impact of the Seaway on the Midwest."

Philadelphia has been selected as the place for the 1956 convention.

IF WEIGHING, BLENDING OR PROPORTIONING MATERIALS IS IMPORTANT TO YOU . . .

THIS NEW GUIDE IS A MUST READING

Richardson's new guide to automatic weighing, blending or proportioning of materials points out *new methods-new equipment applications* in these important processes. Simply find your material in the index, refer to the equipment section and you're on your way to improving your present operations through increased speed, economy and accuracy.

Let Richardson's 50 years of experience in building Automatic Weighing, Proportioning and Blending equipment help you discover new and improved methods in your field—no matter what you handle.

Write today for your free copy of this guide Bulletin No. 0450.

RICHARDSON SCALE COMPANY

Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago
Cincinnati • Houston • Minneapolis
Montreal • New York • Omaha
Philadelphia • Pittsburgh • San Francisco
Toronto • Wichita

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1901

© 7499

truck-men DO MORE FOR LESS . . . Says F. F. KIRCHNER

Model 40 loading a cube of blocks on truck

Model DHP with empty rack in front of kiln

"We have one two-ton Truck-Man Model 40 High Lift and two 4,500 lb. Truck-Man Model DHP's," says Mr. Kirchner, of F. F. Kirchner Material Company, St. Louis, Missouri. "What a combination! One DHP shifts loaded racks from the block machine to the kilns, from the kilns to the cubing area and then takes the empties back to the machine. The 40 takes the cubes to the yard, loads cubes from the yard on highway trucks and even unloads bagged cement and other materials that we receive. The other DHP is used for odd jobs and as an auxiliary in shifting racks when we are rushed.

"We've really got the handling problem licked now," he continues, "That DHP is the most efficient little work horse I've seen and it's so darned economical. Moving loaded racks eight hours a day on two gallons of gas —it's almost unbelievable.

"As for the Model 40, it's easy to see that it was designed from the ground up for block plant use.—Rugged, maneuverable, plenty of power, easily maintained and those big tires can go any place.

"Like everyone else, we're watching costs these days. So we were pleasantly surprised to find we could buy all three of these trucks for a lot less than the cost of two ordinary fork trucks. Our experience has proved to us that they are more efficient and versatile, too."

For information on how Truck-Man can cut costs in your operation, complete and mail this coupon today.

truck-man

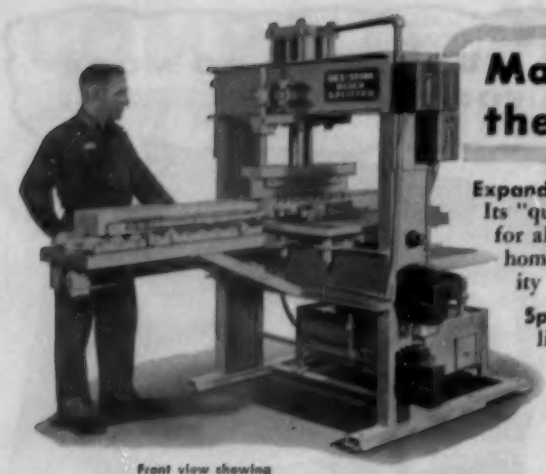
DIV. OF KNICKERBOCKER CO.
650 LIBERTY STREET, JACKSON, MICHIGAN

☐ Have Salesman Call
☐ Send General Catalog
☐ Send Info on Model 40
☐ Send Info on Model DHP

NAME .....

ADDRESS ..... ZONE .....

CITY ..... STATE .....



Front view showing operator feeding block into BES-STONE Block Splitter.

Make this your BEST year with the BES-STONE Block Splitter

Expand Your Opportunities — Cash in on the Split Block demand. Its "quarried stone" character pleases owners. You'll find it ideal for all structures, large or small . . . commercial, institutional or home construction. BES-STONE challenges the creative ability of both architects and builders.

Splitters in 18" and 24" sizes — Automatic, powerful, hydraulic operation . . . up to 960 Split Block per hour. Straight line cuts . . . No cull block. Easily adjustable for splitting various block heights. Block is placed under knife, automatically. And the finished Split Block is automatically removed from under the splitting knife by the incoming block. Quiet, safe operation.

Fast, Accurate

Profitable Producer of 960 Split Block per Hour!

There's big money for you in attractive, permanently colorful BES-STONE Split Block. It complements and increases sales of standard stripper block. Get all the facts. Write for BES-STONE Bulletins 95A and 100.

BESSER 50th Anniversary 1904-1954

Note the natural beauty of BES-STONE. No maintenance, no painting, no peeling off.

BES-STONE *the Split Block with Character*

BESSER COMPANY • Complete Equipment for Concrete Block Plants • Alpena, Michigan, U. S. A.

Your Plant Needs the COUNTER-ACTIVE WEIGHT DISTRIBUTION of GERLINGER LIFT TRUCKS!

In the concrete field especially — where continual changes in load widths and weights are a common transportation problem — Gerlinger Lift Trucks have consistently outperformed other material handlers. Most important reason for this leadership is the nearly even weight distribution of the Gerlinger.

When unloaded, 54% of the lift truck weight remains over the front wheels of the Gerlinger. This unusual balanced weight distribution — an exclusive Gerlinger feature — allows the driving wheels to obtain top traction and braking power under changing load weights and sizes.

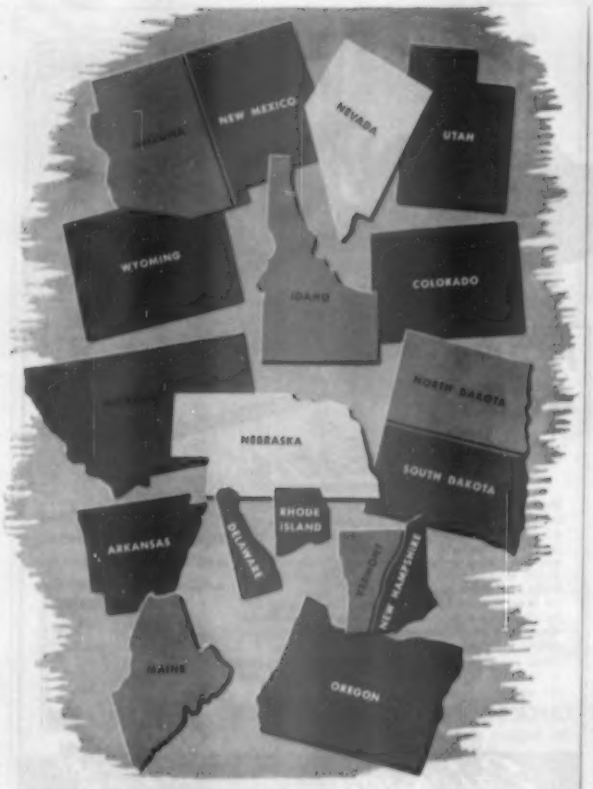
It's just one of many job-proven features that make Gerlinger Lift Trucks first choice in concrete products plants where off-size loads have to be moved and stored.

• Gerlinger's exclusive Counter-Active Weight Distribution is graphically shown here in comparison with the excessive counter weight of other lift trucks. This nearly even weight distribution assures ample braking power at all times, longer tire life, less frame strain and the maximum steering and operating ease

GERLINGER CARRIER CO.

G-207

GERLINGER CARRIER CO., DALLAS, OREGON



Coming A NEW MARKET AS BIG AS THESE 18 STATES

America's rapid population growth constitutes a great future market for concrete masonry.

U. S. population is increasing by about 7000 a day. If this rate continues, there will be an additional 15 million people in the nation by 1960—only five years from now! That is the present population of the 18 states shown above.

These new millions automatically create new markets for houses, schools, hospitals, stores, factories, churches and public buildings—and for remodeling or enlarging existing structures.

Get **your** share of this vast new market by (1) aggressively advertising and merchandising your products, (2) capitalizing on the Portland Cement Association's national advertising by relating your advertising to it and (3) rigidly maintaining quality by producing products complying with ASTM and federal specifications.

Follow this time-tested formula and you will be "in the running" for new business that will come from the continuing growth of the country.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois
A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

NEW! *Profitable lease or purchase plan . . .*

to Manufacture WORLD'S FINEST *Concrete* ROOFING TILE

PROFITABLE OPPORTUNITY is now available to manufacture COMACO Shake-Tile. Patented machinery, molds and formulas can be leased or purchased on five year payment plan. Manufacturers will be licensed to make and sell this highly profitable life-time roofing material. It's the World's finest!

COMACO CONCRETE SHAKE-TILE

Six beautiful styles and many colors make COMACO Shake-Tile the preferred roofing material for all homes, schools, churches and institutional buildings. Approved by architects, it meets the specifications of local, state and Federal codes.

PATENTED PROCESS—NO OVEN CURING

Process developed during past 12 years is simple and fast, permitting large profitable production. No competition. Here's the chance of a lifetime to be first in your market with a nationally accepted, architect approved building material. Write for complete information about five-year lease or purchase plan.

CONCRETE PRODUCTS MACHINERY CO., INC.
1930 Wilshire Blvd., Los Angeles, California

E. M. Wakeman & Assoc., Lakeland, Fla., MU. 2-0311 • F. H. Holtkamp Co., St. Louis 10, Mo., PR. 1-3596 • Metropolitan Equip. Co., Washington 17, D. C., LA. 6-1535 • Williamson Mach. Co., Farmingdale, N. J., FA. 5-6701 • The Brehammer Co., Chicago III., WA. 2-3866.

COMACO®
CONCRETE SHAKE-TILE ROOFING

Improve moisture control, speed loading, save space with Neptune Auto-Stop water meters. Set by pushing buttons; meter cuts off automatically. Excellent reputation for sustained accuracy and trouble-free operation. *Ask for Bulletin 562 WRP*

NEPTUNE

Automatic Water Meters...

FOR READY-MIX PLANTS AND BLOCK PLANTS

NEPTUNE METER CO., 19 W. 50th St., New York 20

Branches and Distributors in Principal Cities

a rugged small truck

Model F-4R
4,000 lbs. capacity

HERE'S A NEW Erickson

- Short Wheelbase & Turning Radius
- Complete Operator Vision
- Large 10-Ply Pneumatics
- 12" Center Underclearance
- Amazing Ease of Handling

For tricky ramps, rough or soft ground, cramped quarters—you will quickly become a booster for Erickson F-4R ease of handling, traction, balance, ruggedness. Comfortable seating space reduces operator fatigue. The F-4R is designed for more work per day—built for lower cost per year. Erickson quality is economy for you! Forks, mast and lift heights as ordered, twin tilt cylinders, 4 speeds forward, 4 speeds reverse. Side-shifter, scoop and other attachments available.

Send for Erickson Catalog on platform trucks to 7000 lbs. cap. and fork models 2000 to 20,000 lbs. cap.

ERICKSON POWER LIFT TRUCKS, Inc.
St. Anthony Blvd. & University Ave. NE, Minneapolis 18, Minn.

Erickson THE WORKHORSE OF LIFT TRUCKS

Do you use LIME PROOF COLORS?

If you concern yourself in any way with the coloring of mortar, cement, concrete, or stucco, we would like to send you our new folder of color chips and formulations. There is no obligation on your part whatsoever.

IRON OXIDE JLS PIGMENTS

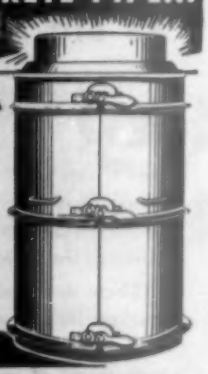
Established 1854

J. LEE SMITH
and Company, Inc.
25 ANN ST., NEW YORK 38, N.Y.

PLANTS:
Hiwassee, Va. Pulaski, Va.

FOR THE FINEST CONCRETE PIPE... YOU NEED FINEST FORMS!

THE Quinn Standard



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

- **QUINN HEAVY DUTY PIPE FORMS**

For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS
BOONE, IOWA

CONCRETE BURIAL VAULTS

AMERICA'S FINEST MOLDS AND LOWERING DEVICES

BERG VAULT SYSTEM

TERRITORY FRANCHISES

BERG VAULT CO.

EQUIPMENT DIVISION
1000 LUCAS HUNT RD. ST. LOUIS

ANTHRACITE CINDERS

also

BLAST FURNACE SLAG

CARLOAD or TRAINLOAD

OUR CINDERS AND SLAG ARE PROCESSED FOR THE MANUFACTURE OF BLOCKS

LOCATIONS ON THE

PENNSYLVANIA, READING, AND CENTRAL OF NEW JERSEY

RAILROADS

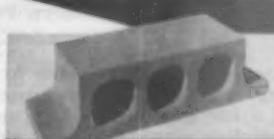
FOR FURTHER INFORMATION CALL OR WRITE

R. P. McMINDES, Inc.

1143 PENN AVE. WYOMISSING, PA.

Phone: Reading 64311

VIBRAPAC Block
for Loadbearing Walls



SOFFIT Block
for Floors and Roofs

Make 'em ALL on a BESSER VIBRAPAC

You'll find Vibrapacs are versatile. They not only make conventional block in all types and sizes, and brick 32 at a time . . . they also make Soffit Filler Block for floors and roofs. And the same set of Plain Pallets takes care of ALL units. Write for literature.

BESSER COMPANY

ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Block Plants

WHERE TO BUY

FOR SALE

1—Model 9 Jolterete complete with Power Offbearer, 4", 8", 12" attachments.
7—¾"—50% Cast and aluminum Pallets.
3—⅞"—Zonal Pressed Steel Pallets.
11—¾"—58% (B17) Cast Pallets.
1—84" Turntable.

Equipment in very good condition. Any of above items can be purchased separately.

Ionia Concrete Products, Inc.
IONIA, MICHIGAN

COLORS *For Cement and Concrete*

COLOR YOUR CONCRETE WITH LANSCO CEMENT COLORS, available in 40 ATTRACTIVE shades. Suitable for all types of concrete products. Write for our new color card, copy of "Suggestions For Using Cement Colors", and for free samples and price list.

Manufactured by:

Landers-Segal Color Co.

78 Delavan St. • Brooklyn 31, N. Y.

SILENT VIBRATING TABLES FOR CONCRETE PRODUCTS

ALSO, METAL MOLDS FOR SPLASH BLOCKS, STEPPING STONES, CHIMNEY CAPS, SEPTIC TANKS AND OTHERS.

For Details Write to: R. L. SPILLMAN CO. 18 W. Morrill, Columbus, Ohio

---

Complete Duntile plant including 1—#2 Automatic Duntile Machine with forms for 8 x 8 x 12; 6 x 6 x 12, 3¼ x 4 x 12, and 4" Drain Tile and several other sizes.

1—#9 Dunn Mixer and Skip Hoist with new mixer tub.

Assortment of packer heads, packer shoes and spare parts.

Priced to sell; must be sold to settle estate.

Inquire

HOMER A. ROBERTS

Rumford, Maine Telephone Rumford 40-M

MAKE OFFER FOR

2 Block Lith-I-Bar Machine with attachments for 12, 8, 6, 4, and 2 types of Chimney Block. Numerous spare parts. 2400—18x18x5/16 Steel Pallets.

In good condition.

IDAHO MASONRY PRODUCTS

1390 Highland Avenue

Twin Falls, Idaho Phone 3060

FOR SALE

Kent Super Blockmaker, Semi-Automatic, one block vibrating machine with 1" and 8" Molds, pallets and racks. Two years old and in wonderful operating condition. Going into a 2 block machine and will sell our present equipment very reasonable.

RICHARD'S BLOCKS

601 Maple Street, Big Rapids, Michigan

Phone 689W

CEMENT PLANT ENGINEER

Established engineering company has opening in its engineering department for Staff Consultant with thorough knowledge and experience in the engineering design of modern Portland cement mills.

Applicant should thoroughly understand the problems of conveying, storing, reclaiming, crushing, grinding, rock beneficiation, burning, classifying, and other unit operations, and wet and dry unit processes for the complete manufacture of Portland cement. He should have knowledge of both capital and operating costs, and be familiar with raw material and energy demands. He should be able to develop the material, energy and heat balances for a prospective plant of stated size and type, and specify and select the machinery and equipment required to attain a given production level.

Duties will consist largely of providing top level engineering and guidance for project engineers, with a moderate portion of time spent on contract development and sales. Experience in other rock product industries will be helpful, but not essential. Location will be in Company's home office in large Mid-Atlantic City. Salary open, commensurate with experience. All replies treated confidentially.

Please write: **BOX N-18, CONCRETE PRODUCTS**
309 West Jackson Blvd., Chicago 6, Ill.

Superintendent of Manufacture
For Concrete Pipe Plant

Large well-established middle-western company needs man with minimum of five years experience who carried full responsibility for the manufacture of concrete pipe, block, or allied field to take charge of all activities in plant having 50-man work force. Qualifications include ability to direct and get along with men, production know-how, cost consciousness, and technical competence. Age 30 to 45. Good salary and future. Please reply, giving personal, educational and work history, including present or last salary.

BOX N-16, ROCK PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

FOR SALE

1—50 ft. Besser Skip Hoist. New Condition.

1—D4 Caterpillar with traction hydraulic high lift.

1¼ yd. hydraulic controlled Link-Belt Crane with 1½ yd. Owen rehandling bucket.

1400 ft.—127 ft. rail with splice bars, etc.

35 ton portable bin and weigh batcher.

EAST GARY CONCRETE PRODUCTS, INC.
2599 DE KALB ST. GARY, INDIANA
Phone East Gary 2-1592

GOOD WILL BUILDERS

For the block manufacturer: Help your contractors and bricklayers get quicker, easier and straighter masonry construction with U.B. tools that carry YOUR advertising. U. B. Corner ties Linestretchers, Line Pins and Twigs. We also wholesale a full line of tools for the block-layer. Write for catalog and prices.

UNITED BUILDERS
1822 Lindberg Drive
Muskegon, Michigan

SACRIFICED FOR QUICK SALE!
A STEAL!

Stearns Model—tamper block machine with mold boxes to manufacture 4" and 8" blocks — complete with electric motor; Stearns ½ C Y mixer with electric motor; 1400 pressed steel, 1200 cast pallets for 7¾" x 15⅝" blocks; 3500 cast pallets for 3⅝" x 15⅝" blocks. All above equipment in good working condition.

Priced for quick sale—$1,000.00.

FRED CARLSON COMPANY
Decorah, Iowa

FOR SALE

Paving mixer, Ransome Model 27 E, Serial 11-282, Single Drum with Buda Power. Has been used very little, Priced $1675.00.

RICHARD REESER
MAROA, ILLINOIS PHONE 67

FOR SALE

10—16" x 4' Forms
2¼" wall thickness.

4—18" x 4' Forms
2½" wall thickness.

1—21" x 4' Form
2¾" wall thickness.

10—24" x 4' Forms
3" wall thickness.

These forms are all in good condition and will sell at sacrifice.

1—steel roller for rolling 48" wide fabric.

BOX N-12, CONCRETE PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

FOR SALE
CONCRETE PRODUCTS PLANT

Located in County Seat Town of central Minnesota. Prosperous farming and dairying community. Competition nil. Excellent expansion possibilities. Concrete and lightweight block—Drain Tile—Septic Tanks—Cess Pools—Lintels—Anchor Block—Reinforced Concrete Culvert Pipe and Sewer Pipe—Gravel Washing Plant with unlimited supply. Plant site consists of 2½ acres of land bordering on major trunk highway. Excellent equipment in A-1 condition. A money maker. Illness forces retirement.

BOX N-3, CONCRETE PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

USED MACHINERY—Besser Vibrapac Machine used by the Oswalt Company. Equipped with Oswalt services. Mixer, skip hoist and bulk cement bin with automatic batcher.

THE OSWALT COMPANY
1335 CIRCLE AVENUE FOREST PARK, ILL.

COLOR YOUR CONCRETE!
SMITHKO
LIMEPROOF CONCENTRATED DRY COLORS
Write for samples and brochure "Getting Results With Color in Concrete and Cement Products"
SMITH CHEMICAL & COLOR CO.
53 JOHN ST. BROOKLYN 1, N. Y.

CONCRETE TILE & BLOCK PLANT

Located in Southern Minnesota. In operation now. Equipment in best of condition. 2000 population. Reasonable terms.

Winnebago Cement Tile & Block Co.
Winnebago, Minnesota

Stearns Model A Clipper; good condition, reasonable. 4", 8", 12" and brick attachments, pallet oiler and racks. Modular steel pallets, like new.

Cihlar Concrete Products
Sturgeon Bay, Wis.

Small Block Plant Owner

I have quite a supply of used machines that are replaced by larger plants who need larger production. Some of these setups are in very good condition. As they are a surplus to me, I will sell on any reasonable terms with payments as low as $50.00 a month.

Mid-Western Concrete Equipment Co.
Box 646 Mukwonago, Wis.

Plant Layout Design Block Machinery

WITTEMANN MACHINERY COMPANY
FARMINGDALE, NEW JERSEY
Specialists in Concrete Products Equipment
Eastern Representatives of the
COLUMBIA MACHINE WORKS, Vancouver, Washington

Elevators Bins Conveyors Feeders

UNBREAKABLE
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

ALSO SEE WHERE TO BUY ADVERTISING ON OTHER EQUIPMENT IN ROCK PRODUCTS' GENERAL SECTION

LOWER COST

PACKER-HEAD WINGS

Proved to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
LUFKIN, TEXAS

FOR SALE

Bros Lectro-Lift Assembly complete with 128" Truck Bed. Used only two months. Priced for quick sale.

Linton Concrete Products
528 Young St., Tonawanda, N. Y.

FOR SALE

Go Corp. Jr. block machine. Excellent condition. 8" and 6" attachments. 8"-6"-10" pressed steel pallets.

Holland Concrete Products Co.
Phone 66214, Holland, Michigan

FOR SALE

Cinder and cement block plant with Bartlle cement roofing tile equipment. Only cinder block plant in this trade territory. Low non-union labor. Town of 12000 on east slope of Rockies. Wonderful climate. All year round construction.

HALL CONCRETE PRODUCTS CO.
CANON CITY, COLO.

GERSON'S GOOD WILL BUILDERS

Advertising necessities for the block industry. Line Pins, Twigs, Corner Blocks, Calculators. Complete catalog on request.

GERSON CO.
82 Dearing Rd., Mattapan, Mass.

PLAIN STEEL PALLETS

Guaranteed Quality
Flat • Square • Accurate

GARY STEEL SUPPLY COMPANY
2300 S. Springfield Avenue, Chicago 23, Ill.
CRawford 7-2525

FOR SALE

Fork and platform power lift trucks, used and guaranteed factory rebuilts.

ERICKSON POWER LIFT TRUCKS, INC.
Saint Anthony Blvd. & University Ave. N.E.
MINNEAPOLIS 18, MINNESOTA
Phone—Sterling 1-9508

FOR SALE

CAST IRON PALLETS

1300— 7⅞ x 15¾—45% . . . 25c ea.
300—11¾ x 15¾—45% . . . 40c ea.

S. M. CAMPBELL CO.
1006 Lynn St., Owosso, Mich. — Phone 934

ADVERTISING PENCILS

Fine high quality advertising pencils with 3 lines of copy for less than 3c each, build good will and sales with our advertising pencils, bring in more sales at less cost. Write to

DIXIE NOVELTY COMPANY
ASHEVILLE, N. C.

FOR SALE

1947 BESSER SUPER VIBRAPAC

Excellent Condition—Reasonably Priced

Calabria Concrete Products Co.
R. D. No. 3, Kane Road, Aliquippa, Pa.
Phone—Essex 5-3342

FOR SALE

750—18½" x 26" x ¼" Steel Pallets.
Reasonably priced.

SPICKELMIER COMPANY
1100 E. 52nd St., Indianapolis 3, Ind.

FOR SALE

ONE USED SEPTIC TANK MOLD,
500 gal. capacity.

BOX N-20, CONCRETE PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

CONCRETE BRICK COLORS
CEMENT COLORS
MORTAR COLORS
made by
BLUE RIDGE TALC CO., INC.
Henry, Virginia

FOR SALE

Kent Super Blockmaker. Semi-automatic, one block, vibrating machine with 4" and 8" molds. Ideal for small and medium size plants. Two years old and in wonderful operating condition. See it in operation at our plant. We are going into a two-block machine and will sell our present machine very reasonable.

ACME BLOCK & SUPPLY CO.
1506 Mackinaw St., Saginaw, Michigan
Phone 34418

Precision Built
VIBRATING TABLES AND
CONCRETE MOLDS

CONCRETE MOLD & ENGR. CO.
Battle Creek, Mich. Ph. WO-23417

Kent Block Machine complete with 8" and 12" Mold Boxes, 4,000 pallets and 14 ft. Belt Elevator, $2500.00.

W. R. NEWINS
Center Moriches, New York

WANTED—Two young men to be trained for Oswalt service to work on the world's newest block machine. Must be willing to travel.

OSWALT ENGINEERING SERVICE CORP.
1335 Circle Avenue, Forest Park, Ill.

WANTED TO BUY

Aluminum or Cast Iron Cored Pallets.
Modular or ⅝" in width. 1000 each of 4", 6", 8" and 12".

Nitterhouse Concrete Products
P. O. Box 258, Chambersburg, Penna.
Phone 1554

WANTED

Block Machine Representative

Established block equipment manufacturer will consider applications for purpose of securing representative on a straight commission basis. May handle non-competitive lines. Write fully regarding experience, present representation and territory desired.

BOX N-17, CONCRETE PRODUCTS
309 West Jackson Blvd., Chicago 6, Ill.

WANTED

Man with around $10,000.00, a keen interest in concrete products, a good understanding of general business procedure and some construction experience to buy a share in a one-machine, two-block, Columbia Model #10 Concrete Products Plant in growing taconite ore producing area.

Biwabik Block Company
P. O. Box 198, Biwabik, Minnesota

Position wanted by an experienced Concrete Pipe and Products Engineer as Supt. or Manager of a Pipe or Products Plant. Salary reasonable. P. O. Box 205, Monticello, Iowa.

CANCER PLAYS NO FAVORITES

See your doctor at once if you have any one of the Seven Danger Signals . . .

1. Any sore that does not heal.
2. A lump or thickening, in the breast or elsewhere.
3. Unusual bleeding or discharge.
4. Any change in a wart or mole.
5. Persistent indigestion or difficulty in swallowing.
6. Persistent hoarseness or cough.
7. Any change in normal bowel habits.

STRIKE BACK AT CANCER
MAN'S CRUELEST ENEMY

give to

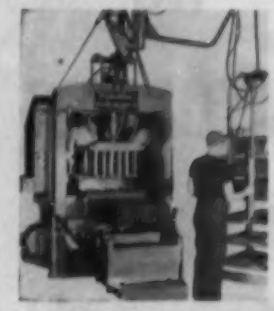
AMERICAN CANCER SOCIETY

SIMPLE!

WE BELIEVE you'll agree that HYDROBLOC is the simplest fully-automatic concrete block machine you've ever seen.

YOU START-STOP the automatic HYDROBLOC with one switch mounted on your offbearer. You make a changeover in minutes to practically any type block. You wash your machine down with a stream of water, with absolutely no damage to the machine.

CAMSHAFT TIMING, as troublefree and foolproof as the timing of your automobile engine, is the heart of the HYDROBLOC machine. It completely eliminates the need for solenoid valves and all of their delicate electrical controls, and provides the simplest means of operating the hydraulic cylinders of the machine. All these controls are enclosed in the dirt-free control panel completely isolated from the rest of the machine.



The HYDROBLOC is low in initial cost, and with its sturdy simplicity throughout, it costs little to maintain. All parts are easy to get at, and you have full protecton everywhere from grit and vibration. The simplified attachment setup has minimized replacement cost of the wearing parts of attachments and reduced changeover time to a minimum.

WRITE TODAY!

HOLLAND MACHINERY CO.
HOLLAND, MICHIGAN

Cash In On Do-It-Yourself
WITH **DRYCRETE**

Dry mixed Cement Products

Choice territories still available for Packaging Franchises.

Write or wire for details to:
R. L. Rauch, V. P. — Sales

DRYCRETE, INC.
P. O. BOX 631, DEPT. CP
BREWTON, ALA.

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

SEE INDEX OF ROCK PRODUCTS SECTION ADVERTISERS ON PAGES 265, 266

Acme Block & Supply Co. 255

Berg Vault Co. 252
Bergen Machine & Tool Co., Inc. 206
Besser Company 236, 242, 250, 253
Biwabik Block Company 255
Blue Ridge Talc Co., Inc. 255
Burmeister, L., Co. 248
Butler Bin Company 244

Calabria Concrete Products Co. 255
Campbell, S. M., Co. 255
Carlson, Fred, Company 254
Chain Belt Co. 229, 230, 231, 232
Cihlar Concrete Products 254
Clark Equipment Company 258
Colorado Fuel & Iron Corp. 239
Columbia Machine 204, 254
Concrete Mold & Engr. Co. 255
Concrete Products Machinery Co., Inc. 251
Cook Bros. Equipment Company 215

Dixie Novelty Company 255
Drycrete, Inc. 256
Dunn, W. E., Mfg. Co. 210

East Gary Concrete Products, Inc. 254
Erickson Power Lift Trucks, Inc. 252, 255

Fanning-Schuett Engineering Co. 208
Fleming Manufacturing Co. 245

Gary Steel Supply Company 255
General Portland Cement Co. 213
Gerlinger Carrier Co. 250
Gerson Co. 255
Go-Corp 246

Hall Concrete Products Co. 255
Heltzel Steel Form & Iron Co. 214
Holland Concrete Products Co. 255
Holland Machinery Co. 256
Huber-Warco Company 240

Idaho Masonry Products 253
Ionia Concrete Products, Inc. 253

Jones, J. A., Concrete Machinery 238

Kent Machine Company 247
Knickerbocker Co. 249

Landers-Segal Color Co. 253
Linton Concrete Products 255
Lith-I-Bar Co. 257
Lone Star Cement Corporation 216
Louisville Cement Company 211

McMinnes, B. P., Inc. 253
Medusa Portland Cement Company 209
Mid-Western Concrete Equipment Co. 254
Motorola Communications & Electronics, Inc. 212

Neptune Meter Co. 252
Newins, W. E. 255
Nitterhouse Concrete Products 255

Olsen, Gene, Corp. 246
Oswalt Company 254
Oswalt Engineering Service Corp. 255

Portland Cement Association 251
Precision Devices, Inc. 248

Quinn Wire & Iron Works 252

Reesor, Richard 254
Richard's Blocks 253
Richardson Scale Company 249
Roberts, Homer A. 253
Roebling's, John A., Sons Corp. 239

Schield Bantam Co. 241
Smith Chemical & Color Co. 254
Smith, J. Lee, and Company 252
Spickelmier Company 255
Spillman, R. L., Co. 253

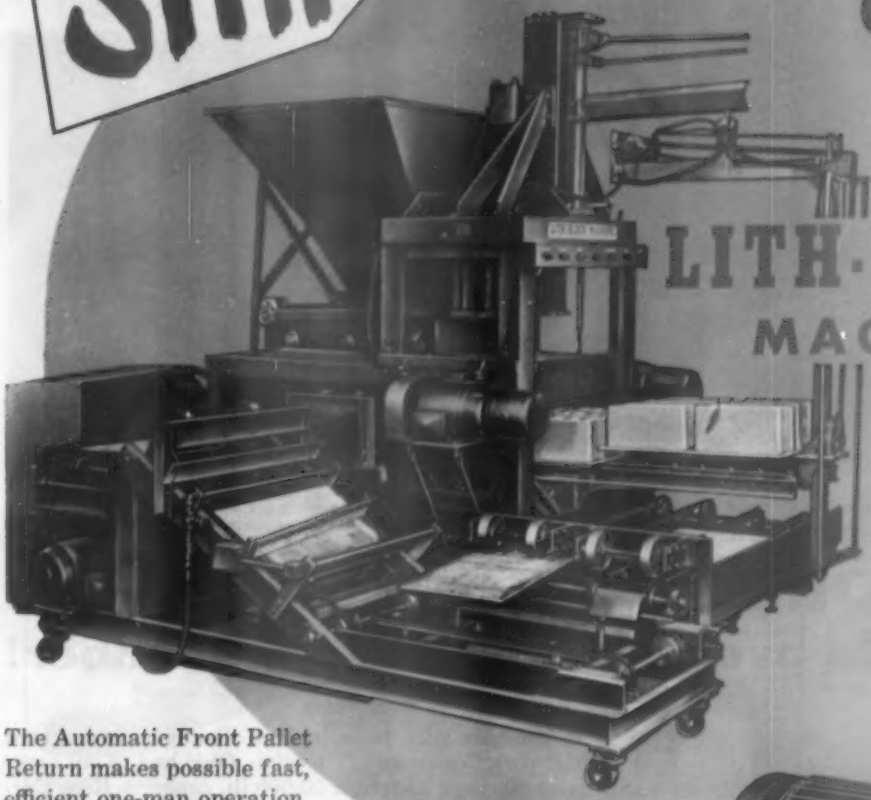
Texas Foundries 254, 255
Trinity White Division 213
Truck-Man Division 249

United Builders 254

Vibor Company 243

Winnebago Cement Tile & Block Co. 254
Wittemann Machinery Company 254
Worthington Corporation 207

Still the QUALITY PRODUCTION Champion



LITH-I-BLOCK MACHINE

- NEW CENTRAL CABINET FOR MAJOR CONTROLS
- NEW DUAL-ECCENTRIC AGITATOR DRIVE
- POSITIVE SIZE AND DENSITY CONTROL
- QUICK-CHANGE MOLD BOX
- STANDARD SIZE PLAIN STEEL PALLETS

The Automatic Front Pallet Return makes possible fast, efficient one-man operation. It may be used with any size Lith-I-Block Machine, old or new, and is available for either right or left hand feed. Lith-I-Block Machines are made in five standard models. There's a size to fit the needs of any producer, large or small.

LITH-I-BLOCK

ONLY THE LITH-I-BLOCK MACHINE MAKES *BONUS QUALITY* LITH-I-BLOCK

LITH-I-MIXER

Advanced design features and rugged construction make this the ideal mixer for block plant operation. Tough, long-wearing, Ni-Hard liners and blades are used in both 30 and 50 cubic foot models.

SEND TODAY for detailed bulletins (Nos. C-102, C-103) on Lith-I-Block Machine and Lith-I-Mixer — a post card will do it.

ONE PIECE OF EQUIPMENT OR A COMPLETE PLANT LAYOUT

LITH-I-BAR CO.

HOLLAND, MICHIGAN

SALES AND SERVICE THE WORLD OVER

A bolster is left at the block plant at all times. Orders are phoned in and loads are made up while the Carrier is in transit.

DIRECT DELIVERY to the Job-Site
...cuts overhead for Geauga Lumber!

5 cubes or 450 blocks are delivered direct to job-site in one easy-to-handle load.

While the Carrier delivers these 3 unit loads, other loads will be made up for the next delivery.

To compete with big suppliers, Geauga Lumber and Millwork Company in Chardon, Ohio had to cut overhead. So they bought a 20,000 lb. capacity Ross Carrier, which eliminated double-handling at both the yard and job-site . . . reduced costly manpower overhead . . . improved customer service . . . speeded up all operations . . . and minimized expensive bolster and carrying-member losses!

Reduced operating costs and increased profits can be traced directly to the Ross Carrier and improved materials handling methods. Geauga's owner, Mr. E. Prohazka, feels it "not only allowed us to compete with big suppliers on an equal basis, but greatly increased the efficiency of our entire operation." You can enjoy the same benefits! Why not call your Clark dealer today . . . listed under "Trucks, Industrial" in the phone book Yellow Pages. He's in business to help you increase your profits.

Remember: it takes 5 seconds for one man to load a Ross Carrier . . . 3 seconds to unload . . . there's no waiting time, all work time. Send for Application History 10-G-52 which explains in detail how Geauga handles concrete block by Ross Carrier.

CLARK EQUIPMENT

ROSS CARRIER LINE
CLARK EQUIPMENT COMPANY
Benton Harbor 60, Michigan

BONDED EQUIPMENT BARGAINS

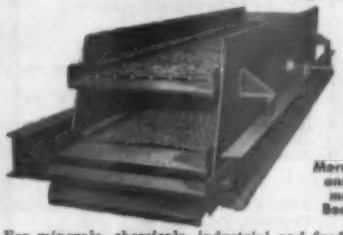
FOR BULK MATERIAL HANDLING AND PROCESSING

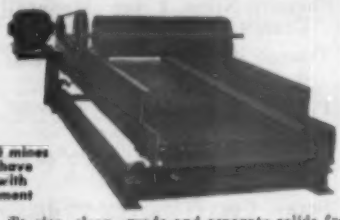
WRITE, WIRE OR PHONE — IMMEDIATE SHIPMENT FROM STOCK

Save up to 50%. Buy now before advancing labor and material costs force us to increase prices

NEW BONDED® HEAVY DUTY VIBRATING SCREENS

"For Continuous, Economical Screening of High Tonnages"





More than 5000 mines and quarries have modernized with Bonded equipment

Partially or totally enclosed screens for all purposes

For minerals, chemicals, industrial and food products. To size, clean, grade and separate solids from liquids. De-watering and de-aerating of liquid foods, tomato products and fruit juices. For rendering, asphalt, lime, sintering and gypsum. Also made in stainless steel, alloy and other metals. Open or enclosed models available for hot materials or when dust and flying particles need be contained. For almost any type of screening operation, wet or dry. Heavy duty models are 4-bearing, positive throw eccentric shaft type, 3'x8' to 5'x14', 1 to 5 decks. Other models have eccentric weight mechanism, spring mounted, 1 to 3 decks, from 2'x4' to 3'x8'. All models low priced, with minimum maintenance and power consumption.

Heavy Duty Screens from .....$1095.00 **General Purpose Screens from** .....$395.00 **Enclosed Screens from** $495.00

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the **BONDED CONVEYOR SPECIALS** listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2 1/16" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
16"	20'	$ 991	$ 548
16"	45'	1785	937
16"	60'	2209	1170
16"	85'	3102	1658
18"	25'	1229	684
18"	45'	1839	1005
18"	60'	2384	1254
18"	85'	3209	1665
18"	100'	3704	1912
24"	25'	1322	773
24"	45'	2062	1145
24"	60'	2617	1426
24"	100'	4097	2166
24"	130'	5207	2773
30"	25'	1421	847
30"	65'	3101	1718
30"	85'	3731	2144

Other lengths and belt width at bargain prices.

LONGER CONVEYORS WITH EXTRA FEATURES

In addition to features described at left, these conveyors include Gravity Takeup, Lagged Head Pulley, Self Cleaning Wing Tail Pulley, Head Shaft and Bearings 2-15/16". Tail Shaft and Bearings 2-7/16", Side Guide Idlers—(1 pr. each for Head and Tail.) Snub Roll at Head end 12¾" diam. using 1-15/16" shaft and bearings. Ratchet and Pawl Holdback. Return belt cover at slight extra cost.

Belt Width	Length of Conveyor	List Price	Sale Price
18"	150'	$ 6,209	$3,507
18"	200'	7,859	4,326
18"	250'	9,509	5,164
18"	300'	11,159	5,993
24"	150'	6,839	3,949
24"	225'	9,595	5,356
24"	300'	12,379	6,763
30"	150'	7,664	4,479
30"	220'	10,604	5,971
30"	300'	13,964	7,677

NEW BONDED GEAR REDUCERS

H.P.	RATIO	PRICE
3	20:1	$ 61.00
5	20:1	142.00
10	20:1	226.00
15	20:1	256.00
2	30:1	61.00
3	30:1	142.00
5	30:1	226.00
7½	30:1	226.00
10	30:1	256.00
15	30:1	394.00

Reducers are right angle with worm on bottom. (Under driven) and all models are fan cooled. Other sizes and ratios available at bargain prices.

NEW CONVEYOR BELTING

SAVE UP TO 28%

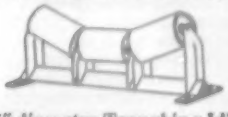
Heavy duty 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

Width	List Price	Sale Price
14"	$3.23 foot	$2.50 foot
16"	3.64 foot	2.62 foot
18"	4.03 foot	2.90 foot
20"	4.42 foot	3.35 foot
24"	5.23 foot	3.76 foot
30"	6.39 foot	4.60 foot

Additional widths and plies available at low prices. Write for free sample.

NEW IDLERS AND RETURN ROLLS

25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for

16" belt	$17.25	30" belt	$19.50
18" belt	18.00	36" belt	20.25
24" belt	18.75	48" belt	21.75

1-roll, 5" diameter Return Idlers for

16" belt	$ 6.75	30" belt	$ 8.25
18" belt	7.13	36" belt	8.75
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.

BUILD YOUR OWN CONVEYOR WITH NEW PARTS

Ready-Made Head, Tail and Intermediate Conveyor Sections
All Types Idlers, Return Rolls, Belting, Reducers and Motors in Stock

Holdback $90.00

Head & Tail $171.00

Roll Idler $6.38

Self-Aligning Idler $56.50

Guide Idler $13.75

Wing Pulley $74.00

New Motor Truck Scales

For stationary and portable applications.

Priced from $535.00

New Bonded® Chain Conveyors

Priced from $421.00

Priced from $741.00

New Cinder, Pumice, Perlite Crushers

Priced from $479.00

New Reciprocating Plate and Pan Feeders

Priced from $423.00

BONDED SCALE AND MACHINE COMPANY

PHONE: Hickory 4-2186 Days — *Write for Catalog and Prices* — PHONE: FR 6-8898, Evenings

128 BELLVIEW — *Mfgrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders* — **COLUMBUS 7, OHIO**

PIECEMEAL LIQUIDATION

MACHINERY AND EQUIPMENT USED FOR PROCESSING CHROME ORE

Rotary Kilns, 5′ x 30′, 7′ x 60′; 7′ x 64′6″.

Rotary Dryers, 4′6″ x 40′, 4′ x 40′, 4′ x 25′, 4′ x 24′

Jeffrey Hammer Mills, 18 x 24

Fuller Lehigh Mill, 42″ dia.

Hardinge 8′ D x 60″ Conical Ball Mill

Buchanan Jaw Crusher 10 x 16

36″ dia. Electro Magnet.

L-B Skip Hoist, 48 TPH

Port. Concrete Mixer No. 3½ non-tilt

L-B Crawler Crane 1¼ yd. bkt.

Osgood Crawler, ½ yd. Shov.

Shepard-Niles 4 ton Monorail Cranes with ¾ yd. bkts.

Trough Belt Conveyors—45′, 85′ & 125′ long

Pan or Apron Conveyors—36′, 85′ x 150′ long

Bucket Elevators (18) 20′ to 60′ high

Screw Conveyors (7) 6″ dia.—24′ to 72′ long

Many other items — Bins, Hoppers, Blowers, Pumps, Motors (up to 200 HP), Scales, etc.

Our Mr. Betz on premises — Mutual Chemical Co. plant, 201 West Side Ave., Jersey City, N. J. (Henderson 3-2161)

LIQUIDATION by

PERRY EQUIPMENT CORP.
1418 N. 6th St.
Phila. 22, Pa.
Stevenson 4-7210

In Collaboration with
MARTIN I. COWEN
233 Broadway
New York City

CRUSHERS & KILNS

CRUSHERS

6′ x 48″ Hardinge Ball Mill, 75 h.p.
5′ Symons, standard cone.
36″x50″ Dixie Hammermill.
36″x30″ Flextooth, 100 HP slipring motor.
Raymond #10, 40 and 47 Imp Mills.
18″x36″ Jaw, Traylor, Bulldog.
14″x16″ Bartlett & Snow, 2-roll.
42″ Symons, vert., disc.
42″x14″ Traylor, 2-roll.
28″x24″ Williams Impact Crusher.
18″x18″ Jeffrey, single roll.
50″ Raymond, 5 roll, high side.
Raymond #1, double whizzer, complete.
Gates #6, Style K, Gyr. 36″ opening.

KILNS—COOLERS—DRYERS

10′ x 200′ x ⅝″ comb. chamber, oil and gas burners.
9′x30′x⅝″ Allis Chalmers.
8′x150′ Vulcan.
8′x125′x⅝″.
6′4″x45′x⅜″ welded, UNUSED.
5′6″x35′x½″ Allis Chalmers.
5′x67′x5/16″.
5′x45′ Stearns Rogers Cooler.
5′x35′ Ruggles Cole XB8.
5′x30′x⅝″ Ruggles Cole.
5′x24′x⅝″ Cedar Rapids with lifters.
4′6″x50′x¼″ with lifters.
4′6″x30′ Ruggles Cole W4.
4′x42′ brick lined.
4′x20′ welded, brick lined.
34″x16′ 6″x⅜″ brick lined, oil fired.
310-16 Roto-Louvre.
604-24 Roto-Louvre.

HEAT & POWER CO., INC.
70 PINE ST., NEW YORK 5
Hanover 2-4890
Machinery and Equipment Merchants

SHOVELS, ELECTRIC: 2, 4, 5 and 6½ yd., Marion, Bucyrus-Erie, P & H., 3 phase, 60 cycle, 2200/4000 volt.

COMPRESSORS: 2—Ingersoll Rand PRE-2, 14 x 23 x 16, 394 H.P., 225 RPM, 2300 volt, synchronous motors. Chicago Pneumatic OCB, 1044 CFM, 200 H.P., 440 volt, 3 phase, 60 cycle.

BLAST HOLE DRILLS: Bucyrus Erie 42-T with 9″ bit and tools, hydraulic jacks, diesel and electric drives. Ingersoll Rand Quarrymaster, diesel powered. Joy Champion electric.

BIT DRESSER: Bucyrus Erie Model 12, 6″ to 18″ bits.

OVERHEAD ELECTRIC CRANES: Whiting 8 ton, 54′ span, 4 motor, clam shell bucket operating, 440 volt, 3 phase, 60 cycle. Several other cranes, A.C. and D.C., various spans, 5 to 150 tons, 2 and 4 motor.

LOCOMOTIVE CRANE: 25 ton capacity, standard gauge, gasoline powered, cast steel trucks, air brakes, with or without 1½ yd. Williams clam shell bucket, thoroughly modern, excellent condition. Located Minnesota. For sale or rent.

LOCOMOTIVES: 2—45 ton diesel electric, standard gauge, thoroughly modern, excellent condition. For sale or rent.

MINE HOISTS: Single and double drum, 100 to 1500 H.P., with all electrical equipment. Complete specifications, drawings and photos available.

HOIST MOTORS:
300 H.P., 435 RPM. 600 H.P., 710 RPM.
600 H.P., 585 RPM. 1200 H.P., 445 RPM.
2300 volt, A.C., with controls.

SCREEN: Tyler Hummer type V-50, 4′ x 5′, double deck, fully enclosed, with Thermionic power converter. Guaranteed condition.

PULVERIZERS: Marcy 6′ x 12′, trunnion and bearing type, with 200 H.P., 440 volt motor, with stone or steel lining. Hardinge 5′ x 22″ Ball Mill complete with motor driven disc feeder, 50 H.P. motor and control. Also, Hardinge Conical Mills 6′ x 36″ and 8′ x 34″, helical gears, spood reducers and motors.

KILNS: 3—Rotary 7′ x 110′, 9/16″ shell, excellent condition.

JAW CRUSHERS: 48 x 60″, 42 x 60″, 36 x 48″, 15 x 30″, with or without motors and drives. Other sizes from 4″ x 6″ up to 48 x 60″.

We Buy and Sell Equipment Throughout North and Central America

A. J. O'NEILL, Lansdowne, Pa.
Philadelphia Phones: MAdison 3-8300—3-8301

FOR VALUES — BUY BRILL

KILNS-DRYERS

2—6′x80′ Allis-Chalmers, ⅝″ shell.
1—8′x125′ Vulcan, ¾″ shell.
1—6′x70′ Allis-Chalmers ⅝″ shell.
3—6′x25′, 6′x30′, 6′x40′ steam tube.
1—5′x67′ Reeves 5/16″ shell.
1—6′x40′ Cummer ⅝″ shell.
2—5′x30′ Cummer 7/16″ shell.
1—4′6″x50′ Vulcan ⅝″ shell.
2—3′10″x16′ Link Belt Roto-Louvre.
1—6′4″x24′ Link Belt Roto-Louvre.

PULVERIZERS-MILLS

1—Raymond High Side Mill, 5 Roll.
2—Pennsylvania Model 3XR-100, 100 Tons per hour.
2—Raymond #1 Pulverizers with 6′ whizzers.
5—Hardinge 4½′x16″, 5′x22″, 6′x22″, 6′x 48″, 10′x48″.
3—Patterson 6′x3′ Ball Mills.

CRUSHERS

2—Allis Chalmers 10″ Superior McCully Crushers, V-belt drive.
1—Allis Chalmers K-9 Gates Gyratory Crusher.
10—Jaw Crushers 5″x6″ to 42″x48″.

SCREEN SEPARATORS

6—Tyler Hummer Screens 5′x5′, 4′x5′, 4′x7′, 4′x10′, 5′x10′, 4′x15′.
1—Link Belt 3′x3′ double deck Screen.
5—Rotex 46″x84″, 46″x120″.
4—Air Separators 6′, 8′, 10′, 14′.

OTHER ITEMS

2—Chicago 14″x7″ Air Compressors, 434 cfm.
2—Oliver Rotary Dewaterers 8′x4′.
12—Bucket Elevators 20′ to 75′ centers.

COMPLETE LIME HYDRATING PLANT
consisting of two #3 Clyde Hydrators, two #1 Raymond Mills, Elevators, Conveyors, etc. Send for Details.

PARTIAL LIST
Send Us Your Inquiries

BRILL EQUIPMENT COMPANY
2401-3 Third Ave., New York 51, N. Y.
4101 San Jacinto St., Houston 4, Texas
Tel: Cypress 2-5703

FOR SALE

One (1) **Marion Shovel** ¾ yd. Model 331-M Good Shape. Caterpillar Engine—S/N 8751.

One (1) **Marion Shovel**, Model 450E, 1¼ yd. — Electric. Condition — Good. Make good shovel for parts.

WRITE

W. S. FREY
37 W. MARKET STREET, YORK, PA.

Giant Bradley Mill & 300 HP motor.
Nos. 12, 10, 9, 8, 7½ and 6 Allis-Chalmers gyratory crushers.
222 & 322 Allis-C. Allis-C.—R & 20″ & 36″ Traylor TY Crushers.
8′x48″, 6′x22″, 5′x22″ Hardinge mills.
1—42″x16″, 36″x16″, and 24″x14″ crushing rolls.
2—New 6½′x150′ Kilns.
1—Complete lime hydrating plant.
1—40″x48″, 36″x48″, 30″x42″, 24″x36″, 16″x36″, 15″x30″, 12″x24″ jaw crushers.
6x12 & 5x10 Rod mills.
14″, 16″, 8″, 6″ McCully Superior Crushers.
5½′x22 and 4′x22 tube mills.
5′x50′x⅜″ dryer. 4½x40, 7x120, 8x125 Kilns.
New and Rebuilt Dryers—Kilns and Coolers

W. P. HEINEKEN, INC.
50 Broad St., N.Y. Tel. Wh. 4-4236

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

CARLYLE

INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — HOSE, WATER, SUCTION, AIR, STEAM AND WELD HOSE

AIR HOSE
WATER HOSE
SUCTION HOSE
DISCHARGE HOSE
STEAM HOSE
FIRE HOSE
OIL HOSE
HYDRAULIC HOSE
WELDING HOSE
VACUUM HOSE

CONVEYOR BELTING
ELEVATOR BELTING
TRANSMISSION BELTING

LOW PRICES!

Immediate Deliveries

WRITE FOR COMPLETE CATALOG

CARLYLE RUBBER CO., Inc.
62-66 Park Place, New York 7, N. Y.
Phone Digby 9-3810

Quarry Equipment

Cedarapids 3240 5A primary unit. New condition.
Cedarapids 2236 jaw crusher with 36" x 12' apron feeder.
Cedarapids Rock-It plant w/2225 jaw, 3033 hammermill.
Telsmith 13B gyratory 13" primary or secondary.
Cedarapids CCC 4024 roll crusher unit.
Cedarapids 6C 4033 hammermill quarry unit.
10x7 Allis-Chalmers Blake type jaw crusher. Rebuilt.
#1 Cedarapids Kubit impact breaker. New condition.
Symons 3' x 12" double deck screen.
Cedarapids 4' x 12' double deck screen.
15 cu. yd. Cedarapids sand drag. New.
60-ton, 2-comp., 5' x 18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"-24"-30"-36". Also belting.
18" dia. x 20" face magnetic pulley.

SHOVELS AND CRANES

Lorain L-820 2-yd. diesel shovel.
Lorain L-820 diesel drag, clam, crane.
Lorain 77, 1½-yd. diesel shovel. Good condition.
Brownhoist 1-yd. gas shovel-crane.
Lorain MC-414 20-ton truck crane.
Lorain TL-25 gas combination.
Link-Belt LS85 diesel combination. Rebuilt.
Unit 514, ½-yd. gas combination. Rebuilt.

TRACTORS, TRUCKS, SCRAPERS, ETC.

6—Euclid rear dumps. Good condition.
4—25FDT Euclid bottom dumps.
1—3BV Euclid loader.
2—Cat DW—10 scrapers. Very good condition.
1—Cat D7 tractor w/blade. Excellent.
1—Cat D6 tractor w/blade. Reconditioned.
1—Int. TD9 w/front shovel attachment. Reconditioned.
Woolridge 15-18 yd. Model TCR scraper.

DIESEL POWER UNITS

Caterpillar D7700, 68 H.P. @ 1000 RPM. Rebuilt.
Caterpillar D9800 with Twin Disc clutch, extended shaft, outboard bearing, 98 H.P. @ 1000 RPM. Rebuilt.
Caterpillar D13000 6-cyl. diesel engine, Twin Disc clutch, extended shaft, outboard bearing, 145 H.P. @ 1000 RPM. Rebuilt.
Caterpillar D17000 8-cyl. diesel engine with Twin Disc clutch, 190 H.P. @ 1000 RPM.
GMC 6-71 diesel engine radiator to and including clutch, 130 H.P. @ 1600 RPM constant duty, electric starting equipment. New condition.
GMC 12-cyl. twin diesel engine complete from radiator to and including automotive type clutch with gear reduction unit, fabricated base, electric starting system, 200 H.P. @ 1200 RPM. New condition.

LIFTING MAGNETS

3—40" Memco lifting magnets, used 2 months.

AIR COMPRESSORS

500 cu. ft. Gardner-Denver diesel, rebuilt.
365 cu. ft. Gardner-Denver diesel, rebuilt.

L. B. SMITH, INC.
CAMP HILL, PA.
Phone Harrisburg 7-3431

LIQUIDATION!
25 Acres
ORE MILL EQUIPMENT
Franklin, N. J.
Partial Condensed Listing!

MISCELLANEOUS

11—Scobey Samplers.
1—6' Oliver Drum Dryer.
1—6' Oliver Filter Table.
3—13½' x 8' Oliver Drum Filter.
28—Trane & Grinnell Unit Heaters.
24—Magnetic Separators.
69—Tanks including Cones, 3' up to 28' x 30'.
14—Feed Rolls up to 36"x36".
1—4'x8' Trommel Screen.
6—Ore Skips.
4—Man Cages.
1—Ross Feeder.
8—Automatic Weight Hoppers.
15—Bottom Dump Ore R. R. Cars.
15—I. R. & Sullivan 15 HP, 2 drum Scraper Hoists.
15 Ton Brownhoist Steam Locomotive Crane.
150 H.P. Vulcan Size No. 72 single drum mine hoist.

ROLL CRUSHERS

1—22"x14" Sturtevant Roll.
4—26"x15" Sturtevant Roll.
2—32" x 36" Edison Rolls.
3—36" x 36" Edison Rolls.

CLASSIFIERS

1—90' Dorr Bowl Rake Thickener.
1—24' Dorr Bowl with 8'x32' rake sect.
3—Dorr 8'x34", 3 deck, 2 section.
2—Pellet Classifiers.

SCREENS, VIBRATING

7—4'x5' Hummer, type V16, 32, & 68.
8—Hummer, type 400, 4'x8'.
11—Tyler Tyrock F-300, 4'x10'.
6—4'x10' Selecto.
3—12 KVA, 15 cycle MG Sets.

DRYERS

1—6'4½" Dia. x 12' L. Link Belt, Roto Louvre Dryer with Machler oil heater.

PUMPS

10—Wilfley, 2" to 4".
9—3" Morris Manganese.
27—Addt'l. Pumps, Centrifugal, Triplex, Vacuum & Sump, up to 5650 GPM.

CONVEYORS

29—SCREW, 6" to 24" D., 10' to 129' L.
29—Bucket Elevators, Belt and Chain types, 25' to 100' high, bucket size from 6"x4" to 22"x19".
43—TROUGHING BELT, 14" to 18" wide, 22' to 124' lengths.
15—FLIGHT (SCRAPER), 24" to 36" wide, 25' to 171' lengths.
1—75', 16" Pan Conveyor.

FANS & BLOWERS

3—#3 Roots.
2—#3 Wilbraham Green.
29—American, Buffalo & Claridge, #'s 5, 6, 17, 21, 35, 60, 80, & 100.
1—Schneible Multiple Wash Dust Collector.

AIR COMPRESSORS

1—12"x12" C. P., Class NSB 392'.
1—17" & 10" x 12" C. P., Class OCS 788'.
1—25" x 15¾" x 18" I-R-PRE-2 2056 ft. 3 phase 440/2300 V.

ELECTRIC MOTORS

800—½ to 700 HP, including Geared Head and Motorized Reducers to 50 HP.

Detailed Inventory mailed upon Request
Phone, Wire, Write TODAY!

L. J. LAND, INC.
Liquidators
Sales Office—Franklin, N. J.
Phone Franklinborough 6-4281
New York Office—149 Grand St., New York 13
Phone CAnal 6-6776

EQUIPMENT INSPECTION SERVICE

We will inspect used equipment for you before you buy, any location. We know where to look for worn parts, signs of abuse, and can give a complete, honest, thorough, concise report. We have had over thirty years experience rebuilding, repairing, maintaining and inspecting Construction equipment of all kinds. Thoroughly experienced on crushing and mining machinery, shovels, draglines, large trucks, dozers, scrapers, muckers, derricks, cableways, drilling equipment, compressors. Electric, Gas or Diesel powered. Give us a try.

Write, Wire or Call

CHARLES A. CONSTANCE
Box 2222 Asheville, N. C. — Phone 3-3968

FOR SALE

CRUSHER SHAFT and bearing assembly for 1540 Champion Good Roads Jaw Crusher.

SAND DRAGS Two #30 Telsmith 30" x 22'. Excellent.

GAS PRODUCER—Natural gas installation makes this unit immediately available. Capacity 6,000 lbs. of coal per hour.

G. & W. H. CORSON, INC.
PLYMOUTH MEETING, PA.

FOR SALE OR RENT

25 ton Orton Diesel Locomotive Crane.
65 ton Porter Diesel-Elec. Locomotives.
44 ton GE Diesel-Elec. Loco., new 1942.
30 yd. Western & Koppel Air Dump Cars.
130 HP Amer. 2D Diesel Hoist & Swinger.
4 yd. P&H Elec. #1400 Quarry Shovel.
2 yd. Bucyrus Erie 51-B Diesel Shovel.
1¼ yd. Manitowoc 2000B Diesel Crane.
1200 CFM Ing. Rand XRE, 200 HP Compr.
50 Steel Dump Cars 36" Ga., 12 ton.

Mississippi Valley Equipment Co.
513 Locust St. St. Louis 1, Mo.

JAW CRUSHERS

6" x 3" to 60" x 48"

Before buying or selling any FARREL-BACON JAW CRUSHERS it will pay you to consult

BACON-PIETSCH CO., Inc.
75 No. Maple Ave. — Gilbert 5-3700
RIDGEWOOD, NEW JERSEY
Engineers and Manufacturers
Machine Shop Facilities
FEEDERS, Conveyors, Screens, etc.
Send for Catalogue

RAILS

NEW — RELAYING — RAIL ACCESSORIES
MIDWEST STEEL CORP.
SALES OFFICE
CHARLESTON, W. VA.
IMMEDIATE DELIVERY

FOR SALE

1—International UD 18 Diesel Generator. 100 H.P. with 43 kv. a. Generator Att. Good condition $2200.00
1—GMC Model 71, 6 cyl. 100 H.P. with clutch and V-belt pulley. Operated 412 hrs. Excellent condition. $2300.00

HENRY K. SMITH
461 West Main Street, Palmyra, Pennsylvania

SURPLUS EQUIPMENT

Available throughout the U.S. — Items you need may be available near you. Your inquiries would be appreciated.

Buildings	Derricks	Loaders	Pavers
Bins	Draglines	Locomo-tives	Rollers
Barges	Ditchers	Rail	Scales
Buckets	Dredges	Mixers	Screens
Belting	Drills	Motors	Stacklines
Cableways	Engines	Mills	Shovels
Cars	Excavators	Machine-tools	Tanks
Compres-sors	Feeders	Pulverizers	Tractors
Conveyors	Graders	Pipe	Trailers
Crushers	Hoists	Pumps	Etc., Etc.
Dryers	Kilns		

(I can sell your surplus equipment)

ALEX T. McLEOD
MARIETTA, KANSAS

Lancaster 6' dia. Vert. Mixer 25 HP.
Kent Model #2 Continuous Mixer.
Abbe 57" x 30" Ball Mill Chrome-Mang. lined.
Raymond #00 and #1 Pulverizers.
Kilns, Dryers, Filters, Hammer Mills, Crushers.
SEND FOR COMPLETE LISTINGS.

STEIN EQUIPMENT CO.
107 8th St., Brooklyn 15, N. Y.
Tel: Sterling 8-1944

FOUNDATION TESTING, CHEMICAL ANALYSIS

CORE DRILLING

THOMASVILLE DRILLING & TESTING CO.
THOMASVILLE, PENNA.

New — RAILS — Relayers

All sections, new and relaying Rails, Angle Bars, Frogs, Switches, Spikes, Bolts and all accessories; cars and locomotives.

M. K. FRANK, 480 Lexington Ave., New York City
Park Building, Pittsburgh, Penna.
108 Lake St., Reno, Nevada—Phone

FOR SALE

Longyear Porta diamond core drill with 100 feet drill steel, also Sullivan Wagon drill on rubber wheels. Bargain, both new.

H. T. SCARBOROUGH
ANNISTON, ALA.

WANTED

COMPLETE GRAVEL DREDGING OUTFIT

10" or 12" pump with diesel or electric power, sectional steel barge approximately 24' x 40', with 40 foot long Swintek or other chain digging ladder, also hose, piping, etc. Please give complete data, location, condition and price.

EDNA COAL CO.
211 Midland Savings Bldg., Denver, Colo.

DEPENDABLE USED MACHINES

Special:—All sizes rebuilt Pioneer and Mesabi 2-deck screens, one to five years old.

20x18 roll crusher	Pioneer 18V Diesel gravel plant	Bay City 45 dragline
16x16 roll crusher	Universal 880 Diesel gravel plant	Link Belt LS-85 dragline
40' bucket elevator	45 ton, 3-comp. port. steel bin	Northwest truck crane
Eagle 22"x22' screw	Ford with Wagner loader	Byers ½ yd. shovel
8 yd. Dumpcrete	Koehring 1¼ yd. Diesel dragline	Butler Carscoop

These machines reconditioned in our newly-built daylight plant. Come see them!

10030 Southwest Highway — TRACTOR & EQUIPMENT CO. — Oak Lawn, Ill.

E. J. LONGYEAR COMPANY

Geological and Mining Consultants
Exploration and appraisal of non-metallic and metallic mineral deposits.

FOSHAY TOWER
Minneapolis, Minnesota

FOR SALE
1 - TELSMITH 8B CRUSHER

SMITH ENGINEERING WORKS
51 E. 42nd St., New York 17, N. Y.
VAnderbilt 6-1131

MOTORS AND GENERATORS

All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

Expert Repair Service

NUSSBAUM ELECTRIC COMPANY
220 E. Douglas Ave., Fort Wayne, Ind.

LARGE LOADER

Practically New, A-C HD-20G, Equipped with extra heavy duty rollers, idlers, guards, semi-grousers, 4-yd. rock bucket, hydraulic rear-mounted ripper. Used only 1100 hours. Price new $41,500.00. Will sacrifice $25,000.

POWER EQUIPMENT COMPANY
DENVER—KEYSTONE 4-4221

CORE DRILLING
--anywhere!

"We look into the earth"

PENNSYLVANIA DRILLING COMPANY
Pittsburgh 20, Pa.

ROCK PRODUCTS

HAS THE LARGEST ABC CIRCULATION AND HIGHEST RENEWAL PERCENTAGE IN THE NON-METALLIC MINERALS INDUSTRY

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

CONSTRUCTION SUPERVISORS WANTED FOR
CEMENT MILL CONSTRUCTION IN MIDDLE EAST

General foreman; structural and reinforcing steel foremen and erectors; carpenter foremen experienced on slip forms for continuous silo pouring; electrical, piping, mechanical and rigger foremen; general excavation quarry foreman; master mechanics, heavy duty, and crane operators.

Must have had experience and good record in cement mill construction; recent foreign experience desirable but not essential.

Must state in first letter: age, full experience, salary expected and family situation. All transportation, maintenance and housing furnished. Replies kept completely confidential.

BOX N-15, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

SAVE ON RAILS

BUY "GUARANTEED RELAYERS"

Handle more cars better — spend less to install & maintain with Foster Relayers. "Open-stock" shipments, all sections 12# thru 175#. Switch Materials, Track items.

Send catalogs ☐ *Rails* ☐ *Track Equipment*
☐ *Send Free 'Track Maintenance' Book*

RAILS - TRACK EQUIPMENT - PIPE - PILING
L. B. FOSTER CO.
PITTSBURGH 30 NEW YORK 7
CHICAGO 4 HOUSTON 2 LOS ANGELES 5

FOR SALE BY OWNER

1—28 Browning Locomotive Steam Crane, 50' boom.
2—Trucks, Autocar Diesel, Mdl. DC-20064-SN, tandem drive, 17 yd. rock dump bed, 200 H.P.
1—Shovel, Lorain Mdl. L-75-B, 1¼ yd. dipper, diesel power.
1—Elevator, Stephens Adamson, buckets 24" x 96", steel chain, 122' centers with drive, 200 T.P.H.
1—Screen 5' x 8' single deck, Tyler Niagara, Type 300.
2—Screens 4' x 6' single deck, Allis Chalmers, Utah type.
22—Pumps, Bingham, Slurry, Sizes 3" and 4" Rubber lined.
6—Pumps, Wilfley, Slurry, Sizes 2", 3" and 5", Mdls. "C" and "K".
14—Flotation Cell Banks, "Morse-Weinig" type, cell sizes 42 x 42 x 48".
2—Coolers 5' x 48' Stearns Rogers.
2—Hydroseparators 60" x 46" Wemco.
2—Filters, Dorr Co., Drum Type, Sizes 10' x 12' x 14' x 18'.

For further information contact J. H. Clements in care of

BASIC REFRACTORIES, INC.
MAPLE GROVE, OHIO

Allis-Chalmers R322 gyratory.
American Clay disintegrator 24" wide.
Champion 9 x 16, lever type jaw.
Jeffrey-Traylor 18 x 48 conveyor screen.
Koppers reducer 27¼ to 1, 20 hp.
Lidgerwood single drum 30 hp dock winch.
Lidgerwood 1 drum hoist 22 hp.
Gravity roller conveyor 24" x 110'.
Gravity roller conveyor 16" x 150'.
Miscellaneous gears to 72" dia.
Pioneer 54 x 24 roll crusher.
Traylor 10 x 16 H Blake type crusher.
V belt pulleys to 60" dia.
Single phase vertical gearmotors, 6 rpm.
Wilfley 4" sand pump.
Sturtevant # 0 rotary crusher 2 hp.
75 assorted gearmotors to 20 hp.
Philadelphia reducer with 30 hp motor.
Link Belt P148 screen.
Spencer turbo 3 hp vacuum cleaner.
Universal 42" x 96" DD screen.
Yale-Kron crane scale 10,000 lbs.
140 Reducers ⅛ to 30 hp.
American 4" pump 140' H. 600 gpm.
Hummer type 31 screen 6' x 5' DD.
Jeffrey #224 tripper, automatic.

G. A. UNVERZAGT & SONS INC.
136 Colt St., Irvington 11, N. J.

strike back at

CANCER

man's cruelest enemy

GIVE

AMERICAN CANCER SOCIETY

1—9"x15" Champion Jaw Crusher.
2—10"x20" Champion Jaw Crushers.
1—Telsmith Portable Plant—10" x 21" overhead eccentric Jaw Crusher, driven by 4 Cylinder Gasoline Engine, 20' Folding Elevator. Steel frame, wheels and draw bar. No screen.
1—Austin-Western Portable Plant—10" x 16" overhead eccentric Jaw Crusher, driven by 6 cylinder I.H. Gasoline Engine. Steel frame, wheels and draw bar.
1—Pair New Holland 16" x 16" Rolls (Lot spare shells and parts).
1—12" Enclosed Cent. Disc. Elevator, 78' centers with Motor. Heavy case.
14—Speed Reducers, 2 to 15 H. P.
1—New 3' x 5' Link-Belt U. P. Shake-out.
500—New 1¾" Crosby Cable Clamps.

JOHNSON & HOEHLER, INC.
P. O. Box 102 Lansdowne, Pa.

FOR SALE

15-ton Whitcomb Locomotive Hercules Diesel Engine.
25-ton Whitcomb Locomotive Caterpillar V8 Diesel Engine.
12-inch Electric Dredge including Pontoon Barge 30' x 40', Allis Chalmers 400 H.P. Motor. No. 12 Thomas Pump 12" Suction and 12" discharge. Two-drum Hoist with 30 H.P. G.E. Motor.
10-inch Electric Dredge including Pontoon Barge 24' x 36', Fairbanks Morse 200 H.P. Motor. Thomas Pump 10" Suction 10" Discharge. 2" Worthington pump with 10 H.P. G.E. Motor. One-drum Hoist with 10 H.P. Motor. Three Beebe Winches 5-ton capacity.

Can be inspected at Richton Sand and Gravel Company, Richton, Mississippi.

Contact
RADCLIFF GRAVEL COMPANY, INC.
P. O. Box 108, Mobile, Alabama
Phone—HEmlock 3-5585

CRUSHERS: 1624 AW, 1218 Acme, 1624 Pioneer, 1536, 1836, 2036 CR, 2436 Lippman, 2450 Champion, 4828 Diamond, 4860 Traylor, 4240 & 8466 Allis C JAW, 10, 14, 16, 20 & 36" McCully, 12K Gates, 1'9" Traylor, 16B, 20A & 48" Telsmith GYR. 2 & 3' Symons CONE.
Pioneer 48V, CR Pitmaster. Good Roads. Diamond Crushing Plants. Complete Gravel Plant.
MILLS: Marcy 6x12. Hardinge 6x2, 7x6, 8x4' Ball. Raymond 5 roll high side. 2633, 4033, 3040 Dixie. 2624 Jeffrey. Williams 4 & 5 Hammer.
DRYERS: 4828, 8x40, 8x50, 7x65, 7x120 & 8x125'. 25 ton Amer. Mode 825 Diesel LOCO. CRANE. 10 x 45 ton Plymouth Diesel Locomotives. Eagle 24" dbl sand CLASSIFIER. Others.
SHOVELS & DRAG: Koehring 304, Buckeye 70, Lorain 75B, Lima 604, 802, 1201, NW6 & 95. P&H 855, 1055, Bucyrus 38B, 51B, 120B, 170B, 175B. Lorain 520, Marion 60A, 92, 93M & 300. ⅜ yd. Lorain MC414 Mtr. Crane, Jaeger Model C. Smith 508 Tilt & non-Tilt Stnty. **MIXERS.**
Repres: Beaded Seals & Machine Co.

MID-CONTINENT EQUIPMENT CO. INC.
6321 Gaseco — St. Louis 24, Mo. — Wydown 1-2828

L. J. LAND, Inc.

ESTABLISHED 1910
One of America's Largest Stocks of
MOTORS — GENERATORS and ELECTRIC EQUIPMENT
A.C. and D.C.
Any H.P. or Voltage
New and Rebuilt in our own shops
One Year Guarantee
149 Grand St. New York 13, N. Y.
CAnal 6-6976
WHAT DO YOU NEED?

JOY BLAST HOLE DRILL
ROTARY AIR
MODEL 56

NOW OPERATING

AVAILABLE IMMEDIATELY

STUNTZ-YEOMAN COMPANY
Delphi, Ind.

CRUSHERS—HAMMERMILLS
2—24x36 Traylor Jaw Crushers.
48" x 60" Traylor Bulldog Jaw.
2—20" Allis Chalmers Superior McCully.
1—54" x 24" Pioneer Crushing Rolls.
3—Symons Std. & Short Head 2 ft. cones.
222R Allis Chalmers Hydro cone.
42x16, 36x16 & 30x16 crushing rolls.
36x24 Jeffrey B 75 hp, 440 V. Hammermill.

LOCOMOTIVES & CRANES
15 ton diesel 60' Boom Whirley crane.
3—65 & 44 ton G.E. diesel elec. Locomotives,
10 ton Plymouth diesel locomotive.
4—125 Ton G.E. Diesel elec. locomotives.
25 ton Amer. Diesel Loco. Crane.

DARIEN, 60 E. 42nd St., N. Y. 17, N. Y.

FOR SALE BY OWNER
BARGAIN—Small, well equipped crushing plant with new power line. 40 years lease on site. One of best locations in southern Va. Granite passes Va. Dept. of Highway as Grade A stone. 5 miles East of Danville, Va. on U. S. Rt. 360. Market for 100 thousand tons annually, or better.

BARNES STONE CO., INC.
P. O. Box 1312, Phone 2132, Danville, Va.

FOR SALE
20,000 NEW INGERSOLL RAND JACK BITS
2⅛" Type 1 Center Hole 4 Point
⅞" Wing with Beveled Skirt.
Price—15c ea. Any Quantity.

AMERICAN ZINC CO. OF TENN.
Muscat, Tenn.

FOR SALE OR RENT
2—85 Ton G.E. Diesel Elec. Loco., 36" Ga.
1—25 Ton G.E. Diesel Elec. Loco., Std. Ga.
1—30 Ton Plymouth ML-6 Std. Ga. Loco.
1—45 Ton G.E. Diesel Elec. Loco., Std. Ga.
2—65 & 80 Ton Whitcomb D.E. Locomotive.
2—20 & 25 Ton Truck Cranes.
1—10 Ton Krane Kar.
1—30 Ton Orton Diesel Locomotive Crane.
2—30 Ton Browning Locomotive Cranes, Diesel and Steam.
1—Large Lot New Spare Parts for Industrial Brownhoist No. 5 or No. 7 Locomotive Crane.
1—3500 Manitowoc Comb. Shovel & Crane.
1—2½ yd. Northwest 80D Shovel.

B. M. WEISS COMPANY
Girard Trust Building, Philadelphia 2, Pa.

30" Kue Ken Gyracone—10B & 12B Telsmith—36" & 50" Sup. McCully—7½K, 8K, 9K Gates A-C—3042, 3648, 4042, 4248, 4860, 5466 jaws—3618, 3618, 4027, 2454 rolls—6½' x 22', Marcy 4'88, 5 x 10, 5 x 14, 6 x 12, 10 x 6 rod & ball mills—Smidth 16B tube mills— 15 & 25 ton Euclids—42T & 29T blast hole drills—50 ton ore cars—65 ton trolley locomotives—Lima 1201—N. W. 6, 80D, 95—7W, 9W, 200W Monighan—Manitowoc 3500 & 4500—Page 618 & 620—P & H 1055—Marion 111—B.E. 120B, 54B, 175B, 51B—939 Lorain—P & H 1055—7 x 110, 10 x 120 kilns.

Crushing plants—rod, ball and hammer mills—gyratories—3', 3', 4' Symons—roll & jaw crushers—screw, rake & bowl classifiers—compressors—convertors—conveyors—drills—dump cars—motors—feeders—generators—hoists—kilns and dryers—pumps—locomotives—shovels and draglines—screens—transformers.

STANLEY B. TROYER EQUIPMENT CO.
Box H, Crosby, Minnesota—Phone 500

CRUSHING & SCREENING PLANTS
(Various Locations)

Cedarapids Model AA2220; also 16x16 Pittmaster, Lippman 2434 & 1624. Cedarapids 3048 "Monark," 1a. 1024 Super-Tandem. Pioneer Model 3x36, 4x10 Marcy Rod Mill like new. Also 42x60 Allis-Chalmers Jaw Crusher, Screens, Cableway, Conveyors, Compressors, Draglines, Shovels.

ALEX T. McLEOD, Marietta, Kansas

PRICED FOR QUICK SALE
1—Allis Chalmers Gyratory Crusher—Model 7½K with numerous spare parts F.O.B. $3500.00
1—Allis Chalmers Areo-Vibe Vibrating 2 deck 4'x8' screen. F.O.B. $500.00
1—Robbins Vibrex Vibrating Screen 2 deck 4'x8', F.O.B. $500.00
1—Robins Gyrex Vibr. Screen 2 deck 4'x10' F.O.B. $500.00

CRUSHED ROCK PRODUCTS INC.
Mason Road, Schenectady, N. Y.

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

E. LEE HEIDENREICH JR.
CONSULTING ENGINEERS

75 Second Street
Newburgh, N. Y.
Phone 1828

9 South Clinton St.
Chicago 6, Ill.
Ph. Franklin 2-4186

Operation
Plant Layout
Design
Appraisals
Construction

FOR SALE
Pioneer 4' x 10' triple deck vibrating screen in good condition.

Builders Lime & Cement Co. Inc.
906 S. Kirkwood Road, Kirkwood 22, Mo.

FREE SERVICE for Buyers

Get information and prices quickly on machinery, equipment. Check item (or items) about which you desire information. Send to us.

*Specify type.

Send to: Research Service Department

ROCK PRODUCTS

309 W. Jackson Blvd. Chicago 6, Ill.

- ___Admixtures, Aggregate
- ___Aftercoolers, Air
- ___Agitators*
- ___Aggregates (special)*
- ___Air Compressors
- ___Air Separators
- ___Asphalt Mixing Plants
- ___Bagging Machines
- ___Bags*
- ___Barges
- ___Batchers
- ___Belting, Conveyor, Elevator, Power Transmission*
- ___Belt Repair Equipment
- ___Bin Level Indicators
- ___Bins and Batching Equipment
- ___Bits*
- ___Blasting Supplies
- ___Block Machines,* Concrete Building
- ___Bodies, Trailer*
- ___Brick Machines and Molds
- ___Buckets*
- ___Bulk Cement Handling Equipment
- ___Bulldozers
- ___Cars, Industrial
- ___Central Mixing Plants
- ___Classifiers
- ___Clutches
- ___Coal Pulverizing Equipment
- ___Concentrating Tables
- ___Concrete Forms
- ___Concrete Mixers*
- ___Concrete Mixing Plants
- ___Concrete Specialty Molds
- ___Concrete Waterproofing and Dampproofing
- ___Conveyors*
- ___Crushers*
- ___Coolers
- ___Cranes*
- ___Curing Equipment
- ___Derricks
- ___Dewatering Equipment, Sand
- ___Diesel Engines
- ___Dragline Cableway Excavators
- ___Draglines
- ___Dredge Pumps
- ___Drilling Accessories
- ___Drills*
- ___Dryers
- ___Dump Bodies*
- ___Dust Collecting Equipment & Supplies
- ___Electric Motors
- ___Engineering Service, Consulting and Designing
- ___Explosives & Dynamite
- ___Fans and Blowers
- ___Feeders*
- ___Fifth Wheel, Heavy Duty Special
- ___Flotation Equipment
- ___Front End Loaders*
- ___Gasoline Engines
- ___Gear Reducers
- ___Generator Sets
- ___Grinding Media*
- ___Gypsum Plant Machinery
- ___Hard Surfacing Materials
- ___Hoists
- ___Hoppers
- ___Kilns: Rotary, Shaft, Vertical
- ___Locomotives*
- ___Lubricants*
- ___Magnetic Separators
- ___Masonry Saws
- ___Mills*
- ___Pipe*
- ___Pumps*
- ___Scales*
- ___Screen Cloth*
- ___Screens*
- ___Scrubbers: Crushed Stone, Gravel
- ___Shovels, Power*
- ___Speed Reducers
- ___Tanks, Storage
- ___Tires and Tubes
- ___Torque Converters
- ___Tractor Shovels*
- ___Tractors*
- ___Trailer Dump Bodies
- ___Trucks, Bulk Cement
- ___Trucks, Industrial
- ___Trucks, Mixer Body
- ___Trucks, Motor
- ___Valves
- ___Vibrators
- ___Welding and Cutting Equipment
- ___Winches
- ___Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

_____

_____

_____

Your Name_____ Title_____

Firm Name_____

Street_____

City_____ State_____

RP-4

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

CEMENT CHEMIST WANTED

With experience as chief or assistant chief Chemist in Portland Cement Manufacturing Plant or equivalent. Location is in the central eastern states. Attractive proposition will be offered to the right man. Include resume of experience, education, age and personal data.

BOX N-5, ROCK PRODUCTS
309 W. Jackson Blvd., Chicago 6, Illinois

PRODUCER WANTED

We have a huge deposit of rock in Clark County Illinois which passes all state inspection for agricultural limestone and road rock and would like to contact a party to set up and produce. This quarry would serve five counties which is nearly 100% grain farming. In the month of May, 1955 there will be bids taken for nearly 40,000 yards of road building material in just one of the five counties served by this quarry.

BOX N-14, ROCK PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

ENGINEERS

SALES — PRODUCT DESIGN

Major heavy machinery manufacturer, located Midwest, has excellent opportunities for mechanical design engineers experienced in research and development and in new product design of machinery used in mining, crushing, cement and basic processing industries. Also sales engineers who have experience in this industry or in sales of heavy machinery. Exceptionally fine working conditions and opportunity for future. Write, stating education, experience, present employment, personal data and salary expected. Replies confidential.

BOX M-94, ROCK PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

QUARRY OPERATORS—AGGREGATE PRODUCERS!! Experienced producer of all types of material; consistent drilling and blasting record in traprock, granite, sandstone, limestone and dolomite with high ratio of rock recovery to dynamite used and proper fragmentation—using wagon, well or rotary drill routines—seeks connection medium to large stationary quarry or turnpike contractor with heavy tonnage. Straight salary basis or make me prove my ability to produce on a cost or tonnage renumeration. Excellent commercial references, multi plant experience, married, perfect health, 53 years of age, available immediately for any U. S. location, willing to qualify in person any major project. BOX N-11, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Illinois.

EXECUTIVE ENGINEER 39, Married, strong background in administration and engineering in the rock products industry, with excellent record of achievements. Experienced in all phases of the manufacture of Portland Cement and non-metallic mineral mining and processing. Now employed, but desire to change to a growing company who can use to the full extent the qualifications possessed. Minimum salary requirement in the five figure range, depending on responsibility and location. BOX M-88, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6.

Wanted Machinery or Plant

Including Rotary Kilns, Direct Heat Dryers, Pulverizers, Crushers, Ball Mills, Vibrating Screens, Power Shovels and Cranes, Bucket Elevators, Conveyors, Filters, Diesel Engines.

P. O. BOX 1351, Church Str. Sta.
New York 8, N. Y.

CHEM. ENG.—Over 16 years in cement and lime production, with extensive technical and operating experience, seeks responsible position in this field. Resume submitted on request. BOX N-19, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

fight cancer with a CHECK

and a CHECKUP

a check to help others...

a checkup to help yourself.

AMERICAN CANCER SOCIETY

INDEX TO WHERE TO BUY

American Zinc Co. of Tenn. 264

Bacon-Pietsch Co., Inc. 262
Barnes Stone Co., Inc. 264
Basic Refractories, Inc. 263
Bonded Scale and Machine Co. ...259
Brill Equipment Co. 260
Builders Lime & Cement Co., Inc. 264

Carlyle Rubber Co., Inc. 261
Constance, Charles A. 261
Corson, G. & W. H., Inc. 261
Cowen, Martin I. 260
Crushed Rock Products, Inc. 264

Darien 264

Edna Coal Company 262

Foster, L. B., Co. 263
Frank, M. K. 262
Frey, W. S. 260

Heat & Power Co., Inc. 260
Heidenreich, E. Lee, Jr. 264
Heineken, W. P., Inc. 260

Johnson & Hoehler, Inc. 263

Land, L. J., Inc. 261, 263
Longyear, E. J., Company 262

McLeod, Alex T. 262, 264
Mid-Continent Equipment Co., Inc. 263
Midwest Steel Corp. 262
Mississippi Valley Equipment Co. 262

Nussbaum Electric Company 262

O'Neill, A. J. 260

Pennsylvania Drilling Company ..262
Perry Equipment Corp. 260
Power Equipment Company 262

Radcliff Gravel Company, Inc. ...263

Scarborough, H. T. 262
Smith Engineering Works 262
Smith, Henry K. 262
Smith, L. B., Inc. 261
Stein Equipment Co. 262
Stuntz-Yeoman Company 264

Thomasville Drilling & Testing Co. 262
Tractor & Equipment Co. 262
Troyer, Stanley B., Equipment Co. 264

Unverzagt, G. A., & Sons Inc. 263

Weiss, B. M., Company 264

SAND AND GRAVEL PUMPING CAN BE PROFITABLE

get the facts FREE

Perhaps you've just hit water and are trying to decide whether or not to pump. And, if so, what pump to use.

Or maybe you've been pumping for years but are beginning to question the efficiency of your present installation.

In either case, our experienced hydraulic engineers stand ready to help you . . . absolutely without obligation.

They will ask you to furnish certain basic information about your deposit, location, pumping distance, etc. From this information they will prepare a detailed analysis for you . . . an analysis and recommendation upon which you can make a sound judgment in selecting and installing your equipment.

Take advantage of this *free* service —today! Tear out the coupon and mail it. It may be worth a great deal of money to you.

AMSCO® DIVISION

AMERICAN Brake Shoe COMPANY

Chicago Heights, Ill.

Amsco Division (Pump Department)
Chicago Heights, Ill.

I want a free analysis without obligating myself. Send all information to:

Name_____

Title_____

Company_____

Address_____

_____

INDEX TO DISPLAY ADVERTISERS

Allis-Chalmers Mfg. Co. 21, 28, 109, 196
Allis-Chalmers Tractor Division 171
American Brake Shoe Company
Brake Shoe & Casting Division 197
Amsco Pump Division 266
American Pulverizer Company 174
American Steel & Wire Division 10, 11
Armco Steel Corporation 22
Armstrong-Bray & Co. 184
Atlas Powder Company 24
Austin-Western Division 26

Babcock & Wilcox Company 23
Bailey Meter Company 106, 107
Baldwin-Lima-Hamilton Corporation 26
Baltimore & Ohio Railroad 14
Barber-Greene Co. ....Inside Front Cover, 198
Bay City Shovels, Inc. 194
Bemis Bro. Bag Co. 124
Berg Vault Co. 252
Bergen Machine & Tool Co., Inc. 206
Besser Company 234, 242, 250, 253
Bin-Dicator Co. 200
Blaw-Knox Company 196
Bohn Aluminum & Brass Corporation 18
Bradley Pulverizer Co. 119
Bucyrus-Erie Company 121, 169
Buda Division 196
Buell Engineering Company 54
Burmeister, L., Co. 248
Butler Bin Company 244

Cambridge Instrument Co., Inc. 201
Cape Ann Anchor & Forge Co. 188
Carlisle Corporation 193
Caterpillar Tractor Company 101, 102, 103, 104
Chain Belt Co. 42, 229, 230, 231, 232
Chase Bag Company 132
Chevrolet Motor Division 140, 141
Chrysler Corporation 34, 35
Clark Equipment Company 139, 258
Cleveland Rock Drill Division 123
Colorado Fuel & Iron Corporation .126, 188, 239
Colorado Iron Works Co. 176
Columbia-Geneva Steel Division 10, 11, 139
Columbia Machine 204
Combustion Engineering, Inc. 172, 173
Concrete Products Machinery Co., Inc. 251
Continental Gin Company 19
Cook Bros. Equipment Company 215

Dart Trucks 193
Deister Concentrator Company 132
Deister Machine Company 191
Dempster Brothers, Inc. 133
Denver Equipment Co. 28
Detroit Diesel Engine Division 48, 49
Diamond Iron Works 179
Dorr-Oliver Incorporated 175
Dryerete, Inc. 256
Dunn, W. E., Mfg. Co. 210
duPont, E. I. de Nemours & Co., Inc. 20, 47

Eagle Iron Works 52
Easton Car & Construction Company 3
Eaton Manufacturing Company 39
Ensign-Bickford Company 136
Erickson Power Lift Trucks, Inc. 252
Erie Strayer Company 202
Euclid Division .....Inside Back Cover

Farrel-Bacon 178
Fanning-Schuett Engineering Company 208
Fate-Root-Heath Company 46
Fiske Brothers Refining Co. 190
Fleming Manufacturing Co. 245
Ford Motor Co. 177
Fuller Company 37

Gardner-Denver Company 144, 145
Gates Rubber Co. 12
General American Transportation Corp. .. 37
General Motors Corporation
.....48, 49, 140, 141, Inside Back Cover
General Portland Cement Co. 213
General Refractories Company 56
Gerlinger Carrier Co. 250
Giffels & Vallet, Inc. 147
Gilman Paper Company 127
Gilson Screen Co. 192
Go-Corp 246
Goodman Manufacturing Company 176
Goodrich, B. F., Company 1
Gruendler Crusher & Pulverizer Co. 184
Gulf Oil Corporation 9

Hardinge Company, Inc. 182
Harnischfeger Corporation 179
Hayward Company 182
Heil Co. 162
Heltzel Steel Form & Iron Co. 214
Hetherington & Berner Inc. 190
Holland Machinery Co. 256
Hough, Frank G., Co. 115
Huber-Warco Company 240

International Harvester Company 23, 115
Iowa Manufacturing Company 44, 45

Jones, J. A., Concrete Machinery 238
Jones & Laughlin Steel Corporation 135

Kaiser Aluminum & Chemical Sales, Inc. ..117
Kennedy-Van Saun Manufacturing & Engineering Corp. 90, 91
Kensington Steel Company 97
Kent Machine Company 247
Knickerbocker Co. 249
Koehring Company 16, 17
Kraft Bag Corporation 127

LeRoi Division 60
LeTourneau-Westinghouse Company ..165, 167
Link-Belt Company 200
Link-Belt Speeder Corporation 8
Lippmann Engineering Works 95
Lith-I-Bar Co. 257
Lone Star Cement Corporation 216
Louisville Cement Company 211

Mack Trucks 43
Macwhyte Company 50
Manhattan Rubber Division 151
Marietta Concrete Corporation 142
Marion Power Shovel Co. 27
McLanahan & Stone Corporation 93
McMinnes, R. P., Inc. 253
McNally Pittsburgh Mfg. Corporation 198
Meckum Engineering, Inc. 195
Medusa Portland Cement Company 209
Merrick Scale Mfg. Co. 188
Merritt-Chapman & Scott Corporation 27
Mine & Smelter Supply Co. 176, 180
Minneapolis-Moline 158
Morris Machine Works 164
Motorola Communications & Electronics, Inc. 212
Murphy Diesel Company 189

Naylor Pipe Company 159
Neff & Fry Co. 186
Nelson, N. P., Iron Works, Inc. 156
Neptune Meter Co. 252
Nordberg Mfg. Co. .....Back Cover
Northern Blower Company 166
Northwest Engineering Co. 5

Oliver Corporation 41
Olsen, Gene, Corp. 246
Osgood-General 27
Owen Bucket Co. 128

Pangborn Corporation 96
Pettibone Mulliken Corporation 25
Pioneer Engineering Works, Inc. 163
Plymouth Locomotive Works 46
Poor & Co. 97, 163
Portland Cement Association 251
Precision Devices, Inc. 248
Productive Equipment Corp. 186

Quaker Rubber Corporation
Division of H. K. Porter, Inc., of Pittsburgh 187
Quinn Wire & Iron Works 252

Raybestos-Manhattan, Inc. 151
Raymond Division 172, 173
Ren Motors, Inc. 18
Research-Cottrell, Inc. 157
Resisto-Loy Co., Inc. 201
Richardson Scale Company 249
Rockwell Spring & Axle Company ...148, 149
Roebling's, John A., Sons Corporation 239
Rollway Bearing Co., Inc. 161
Ryerson, Joseph T., & Son, Inc. 192

Schield Bantam Co. 241
Screen Equipment Co., Inc. 13
Sheffield Steel Division 22
Simplicity Engineering Company 131
Sly, W. W., Manufacturing Co. 160
Smidth, F. L., & Co. 30
Smith Engineering Works 15
Smith, J. Lee, and Company, Inc. 252
Standard Metal Mfg. Co. 199
Sterling Electric Motors 192
Stoody Company 87
Sturtevant Mill Company 40
Syntron Company 155

Tennessee Coal & Iron Division 10, 11, 139
Thew Shovel Co. 185
Timken Detroit Axle Division 148, 149
Timken Roller Bearing Company 4
Traylor Engineering & Mfg. Co. 6, 7
Trinity White Division 213
Truck-Man Division 249
Twin City Iron & Wire Co. 180
Tyler, W. S., Company 195

Union Wire Rope Corp. 28, 29
United States Steel Corporation ...10, 11, 139
Universal Engineering Corporation 25
Universal Road Machinery Co. 200
Universal Vibrating Screen Co. 183

Vibor Company 243
Victor Equipment Company 152
Vulcan Iron Works 183

Wedge-Wire Corporation 199
Western Precipitation Corp. 181
Westinghouse Air Brake Co. ...60, 123, 165, 167
Wickwire Spencer Steel Division 125, 168
Wilfley, A. R., & Sons, Inc. 176
Williams Patent Crusher & Pulverizer Co. 113
Wood, Charles E., Company 201
Worthington Corporation 207

Yuba Manufacturing Co. 190

SMALL QUARRIES AND MINES IMPROVE THEIR PROFIT PICTURE WITH "EUCS"

fewer drivers . . . lower fuel cost . . . reduced maintenance

When your competitors are using "Eucs" to haul stone, sand or gravel, you've really got a problem on your hands! You just can't afford to pass up the cost cutting advantages . . . the high production and low maintenance cost . . . that you get with "Eucs".

And your operation doesn't have to be a big tonnage producer for "Eucs" to pay off. For example, H & R Stone Co. of Indiana is just one of many small quarries, sand and gravel producers, and open pit mines that have cut their hauling costs with Model UD 10-ton Rear Dumps. This quarry replaced four conventional highway trucks with a single 10-ton "Euc" and reports savings of $6000 per year in maintenance cost alone. Because the "Euc" stays on the job with none of the lost time that was a costly headache previously, there have been important savings in labor cost, too.

Have your nearby Euclid Distributor provide a production and cost estimate for your operation . . . there's no obligation and the chances are mighty good that he can show the way to better profits through lower hauling costs.

10-ton off-highway "Euc"

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

From the agricultural areas of the nation...

to the sidewalks of every village, town and city . . .

LIMESTONE

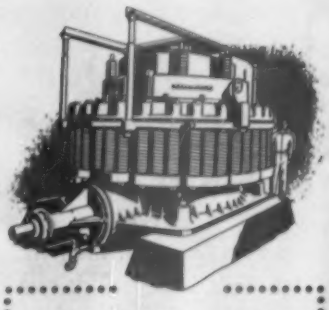
has paced the progress of AMERICA

★

In the great agricultural lands of America, limestone has long been recognized as an invaluable aid to raising better crops . . . as well as an important mineral supplement in poultry and animal feeding. In the building of the modern cities of today, limestone has paced America's progress by making possible better roads and streets, building stone, cement, steel for building and transportation, glass . . . and hundreds of other materials and products that are woven into the pattern of modern civilization.

With man's continual expansion of the number of uses of limestone, and ever-increasing refinements in specifications, the problem of rapidly furnishing properly sized stone to meet today's requirements has become more difficult. Symons® Cone Crushers have become the answer to scores of these problems, and as a result, hundreds of Symons Cone Crushers . . . in both Standard and Short Head types . . . have been installed by most of the leading producers of crushed limestone throughout the world.

Thus, in limestone operations . . . *as in all of the great ore and industrial mineral operations the world over* . . . SYMONS Cone Crushers are relied upon to efficiently produce great quantities of finely crushed product at low cost.



SYMONS Cone Crushers . . . *the machines that revolutionized crushing practice* . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

C352

NORDBERG MFG. CO., Milwaukee, Wisconsin

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON • TORONTO

MEXICO, D.F. • LONDON • PARIS • JOHANNESBURG

SYMONS GYRATORY CRUSHERS

GRINDING MILLS

SYMONS "V" SCREENS

SYMONS VIBRATING BAR GRIZZLIES and SCREENS

DIESEL ENGINES